

MassWildlife



***Annual
Report 2002***

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MassWildlife

MASSACHUSETTS
DIVISION OF FISHERIES & WILDLIFE

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Director

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THE BOARD REPORTS

George Darey
Chairman

The Massachusetts Fisheries and Wildlife Board is a group of seven persons, each selected for a demonstrated interest in wildlife. By law, the persons appointed to the Board are volunteers, receiving no remuneration or expenses for their service to the Commonwealth. Five of the seven are selected on a regional basis, with one member, by statute, representing agricultural interests. The two remaining seats are held by a professional wildlife biologist or manager, and a representative with a specific interest in the management and restoration of those wildlife populations not classified as game species. Each member is appointed by the Governor to a five year term. The Board oversees operations of the Division of Fisheries and Wildlife, reviews the agency's programs, and sets policy and regulations pertinent to wildlife in the Commonwealth.

During this fiscal year the Board continued to hold monthly meetings at locations around the state, hold public hearings on proposed regulatory changes, and address issues of specific concern. The Board would like to state for the record that we are very proud of the Division, which ranks as among the most efficient agencies in state government and continues to meet its mandate despite a reduction in personnel from 154 employees to 142 since 1980. This says much about the quality of its extraordinarily dedicated personnel.

While many different matters and issues were brought before the Board this year, most of its time was spent in scrutiny and review of Division programs and proposals for regulatory changes. Among the items examined were:

Waterfowl Regulations

The Board heard its annual presentation from Waterfowl Project Leader H Heusmann on the framework and proposed season dates, bag and possession limits for the 2001 waterfowl seasons. Following a public hearing on these proposals, the Board voted unanimously to accept them as presented.

Turkey Regulations

The Board heard a brief review and history of turkey management in Massachusetts from Turkey Project Leader Jim Cardoza, along with a staff proposal to move the boundary for the fall turkey season eastward to the eastern boundary of Deer Management Zone 9. The Board voted unanimously to hold a public hearing on the proposal.

Deer Management Regulations

Following a presentation from Deer Project Leader Bill Woytek, the Board voted unanimously to approve the staff's recommendations for antlerless deer permit allocations for the 2002 season.

Mr. Woytek also presented the Board with sweeping proposals for deer regulation changes for the year 2002. These changes included:

- changing the Zone 12 boundary from Routes 44, 58 and 28 to the Cape Cod Canal; removing the "pre-1865 design or facsimile" criteria for primitive firearm season, allowing closed ignition system in-lines, sabots, and scopes;
- requiring an antlerless deer permit to take an antlerless deer in any season (noting that each antlerless permit will have a tag attached; and increasing the bag limit in Zones 1-9);
- clarifying that when untagged deer are transported, "the carcass or a portion thereof" be open to view;
- allowing hunters to have two unsealed deer in their possession;
- a provision that antlerless deer harvested during the Quabbin special hunt *not* count against a hunter's bag limit for antlerless deer;
- to increase the archery deer season to six weeks statewide;
- to extend the primitive firearms season to the last legal hunting day of the calendar year.

A public hearing was held to solicit comment on these "modernizing" proposals, and following consideration of those comments and some slight adjustments, the regulations were voted on and unanimously approved to take effect in 2002.

On another deer-related matter, the Board heard a presentation from Dr. Rob Deblinger on Chronic Wasting Disease, a prion disease that is similar to the "Mad Cow Disease" of Europe. CWD can affect deer, moose and elk, and has been detected in a number of western states. Due to its potential to decimate wild deer herds, and to protect the stock of the 25 deer farms in Massachusetts, the Board voted unanimously to impose an immediate moratorium on the importation of all live cervids into the Commonwealth.

Concerns

The Board has always closely monitored the operations and budget of the agency, but this year it is particularly concerned with the effects of level funding, a hiring freeze, and a total of 18 vacancies, most of which occurred as a result of the early retirement incentive offered to all state employees. We thank those employees who elected to take this option for their many years of dedicated service, but these many vacancies will undoubtedly affect the agency's operations. As only 20% of the vacated positions can be filled due to the fiscal restrictions now applied to all state agencies, this situation is likely to remain a problem for some time to come. We are pleased that the critical positions of Deputy Director of Field Operations and Southeast District Manager have been filled, but counteracting the loss of other key personnel, and the loss of personnel in the Fisheries Section in particular, remains of great concern and must be addressed if the agency's operations and level of public service are to be maintained.

We were also very disappointed that, due to the unavailability of Camp Cachelot this year and despite a strong but unsuccessful effort to secure an adequate alternative facility, Conservation Camp had to be cancelled in 2002. We are assured that this situation will be remedied for 2003.

At the start of the year we were very concerned about the possible removal of environmental knowledge requirements from the exam for Environmental Police Officers. We are pleased to report that our efforts and those of the Commissioner and various sportsmen were sufficient to maintain these requirements. Later, when there was an attempt to transfer the Division of Environmental Law Enforcement to the Department of Public Safety through the preliminary state budget, the Board voted unanimously to issue a proactive amendment to counter that action. We are relieved that DELE was indeed retained within the Department thanks to the efforts of many organizations and individuals.

The Board is also concerned about the current prohibition of out-of-state travel for state employees, which hampers regulatory and biological staff in their ability to remain apprised of current research and techniques. Further, it does not allow staff to remain directly involved in regional and broad-based conservation issues to which this agency's staff has always contributed. The Board voted to instruct the Commissioner to take immediate action in addressing necessary travel for agency personnel to enable the agency to fulfill its regulatory responsibilities.

The Board also voted unanimously to reaffirm its position on banning off road vehicles (ORVs) on *MassWildlife's* lands, and went on record as opposing any extensions of ORV use on any state lands.

Miscellaneous

A public hearing was held in July to consider proposed regulations of a largely housekeeping nature to update names of certain WMAs and remove reference to the option to purchase birds from the state; to update the list of WMAs stocked with pheasant; and to adjust special regulations for the Delaney, Flint Pond and Ludlow WMAs. These regulations were voted on and approved unanimously.

The Board extends its congratulations to Mr. Ted Giddings of Lenox who was nominated by the Francis Sargent Award Committee to receive the 2001 Sargent Award. The Board voted unanimously to bestow this award on Mr. Giddings for his strong, lifelong support of sportsmen and the conservation of natural resources during his long career as an outdoor journalist.

The Board is very pleased with the BioMap publication produced through EOEa by the Natural Heritage & Endangered Species Program, and commends the staff and all those who were involved in its production. It should prove an extremely valuable conservation tool for state agencies, communities and others involved in land conservation.

Noting the critical importance of extending the opportunity to take Hunter Education classes to the public, the Board voted unanimously to pursue the idea of a cooperative agreement with shooting ranges to enhance the number and quality of hunter education programs.

Director Wayne MacCallum was nominated to serve on the North American Wetlands Council as a representative of the eastern seaboard. The Board voted unanimously



The Fisheries and Wildlife Board presented the second annual Francis W. Sargent award. This year's award was presented to Outdoor Writer Ted Giddings (right) by EOEa Secretary Bob Durand.

that the Director accept this position, and congratulates him on this nomination.

The Board also heard presentations on the Open Space Bond Initiative; the cleanup of the Housatonic River; the BioMap Project; the Biodiversity Program; using remote cameras to monitor carnivores; the Massachusetts Cover Mapping Project; MassOutdoors Internet Licensing Program; fish population assessment in rivers designed to develop measurable goals for what constitutes a healthy population (which becomes the "target" for biological integrity); the Anadromous Fish Restoration Project; a review of black bass management; and an overview of the current "living with coyotes" program as it is regularly presented to communities with concerns about this species.

We are very pleased and thankful that the electronic sales of licenses, which the Board voted to endorse some time ago, is now proceeding smoothly. Making licenses available for sale over the Internet provides a great convenience to the public and is becoming increasingly popular judging by how rapidly such sales are increasing.

We are also pleased to report that monies were provided by EOEa to upgrade the McLaughlin Hatchery in Belchertown. All infrastructure work such as well, pumps, raceways and paving of drive and walkways has been completed, and plans are well underway for a visitor/education center. We look forward to seeing this project reach completion.

**Massachusetts
Fisheries and Wildlife Board**

George L. Darey, Lenox, *Chairman*

John F. Creedon, Brockton, *Vice Chairman*

Michael P. Roche, Orange, *Secretary*

Russell A. Cookingham, Monument Beach

Ernest W. Foster, Jr., Worcester

Joseph S. Larson, Pelham

Frederic Winthrop, Ipswich

FISHERIES

Dr. Mark S. Tisa
Assistant Director

Three important members of the fisheries staff accepted an early retirement package and left the Division of Fisheries and Wildlife on March 15, 2002. Biologists Joseph Bergin, Richard Keller and William Easte had close to a one hundred year's worth of experience and institutional knowledge between them. Their experience and expertise will be missed not only by the staff, but by the sporting public they worked so hard to serve. Their duties and responsibilities were reassigned to the remaining fisheries staff because of a hiring freeze due to the state's fiscal situation. We thank them for all their years of public service and dedication to the protection and enhancement of the Commonwealth's fisheries resources.

Fishing, hunting, and wildlife related recreation are important recreational activities for residents and non-residents of Massachusetts. According to the 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, more than 310,000 Massachusetts residents age 16 and older went freshwater fishing during 1996. Additionally in 1996, more than 66,000 nonresidents fished the state's lakes, ponds, rivers and streams. An average of 14.4 days were spent fishing by each fisherman. Fishing pressure in Massachusetts is estimated at 40 trips/acre versus the national average of 27 trips/acre. In 1996, the American Sportfishing Association estimated expenditures of \$274,273,777 for freshwater recreational fishing in Massachusetts and generated over \$26 million in sales tax revenue and created some 5,636 jobs.

The Commonwealth's aquatic resource inventory includes a variety of both lotic and lentic fisheries habitat ranging from coldwater, wild trout fisheries to warmwater panfish species. There are approximately 2,675 lakes and ponds, totaling about 142,681 surface acres. Ponded waters are mostly less than 500 acres in size. The two largest bodies of water, both man-made drinking water supplies, are the Quabbin (25,000 acres) and Wachusett (5,000 acres) Reservoirs. The largest river in Massachusetts is the Connecticut River with 72 miles (7,284 acres) transecting the Commonwealth. The 2,027 named streams flow about 10,704 miles and comprise approximately 14,900 acres. The protection, management and enhancement of these inland fisheries resources and their associated habitats involves several ongoing fisheries projects.

Fisheries Survey and Inventory Project

Fiscal Year 2002 Stream Survey project involved participation in the following projects:

1. Statewide Fisheries Survey and Inventory
2. Target Fish Community Development
3. Massachusetts Watershed Initiative Funding
4. Coldwater Fisheries Resource Designation

1. Statewide Fisheries Survey and Inventory

Watersheds were sampled as part of the 5-year basin cycle using a standard sampling protocol. The majority of the 238 sites sampled were in the Westfield, Blackstone, Concord, and South Coastal watersheds. Samples were also taken on the Nashua, Housatonic, Farmington, Deerfield, Charles, Chicopee, Connecticut, Hoosic, Merrimac, Millers, Quinebaug, and Taunton. The sampling resulted in the collection of 38,797 fish of 49 different species. Requests for potential stream survey and inventory sampling locations in the above watersheds were solicited from agencies and stakeholders and were used to prioritize sampling locations. Planning was initiated to focus FY03 sampling in the Housatonic, Connecticut, Nashua, Charles, North Coastal, and South Coastal watersheds.

For further information on the standard sampling protocol and/or the areas sampled during FY 2002, see Appendix I, page 65.

2. Target Fish Community Development

Efforts continued on the development of the Target Fish Community and were based on Bain and Meixler (2000). The Ipswich River Target Fish Community project was completed by the Ipswich River Task Force. The planning process was initiated for drafting target fish communities on the Charles and Housatonic Rivers. Refinements to the Target Fish Community concept were forwarded by federal and state fisheries experts from the northeast. When combined with Statewide Fisheries Survey and Inventory, the Target Fish Community concept continues to illustrate that our river fish communities are being impacted by water quality and quantity issues and habitat alteration. The Target Fish Community illustrates what a river fish population should look like in Southern New England and represents a measurable goal for restoration.

3. Massachusetts Watershed Initiative (MWI) Funding

MDFW received funding through MWI again this fiscal year. The total for FY02 was \$45,000. This funding was crucial in maintaining and upgrading our sampling resources and retaining our capability to be proactive in our approach to monitoring fisheries resources state-wide. The funding was used to continue the trend toward fully equipping MDFW Districts and the Westboro field crew so they can monitor and assess fisheries resources across the state and maintain the equipment they have received. Field equipment, including boats, motors, trailers, GPS units, nets, waders and other accessories were purchased to enable five fully equipped crews to sample watersheds throughout the state. *MassWildlife's* ability to present this information to stakeholders was also increased through the purchase of LCD projectors and computer equipment.

4. Coldwater Fisheries Resource Designation

A project to identify waters that *MassWildlife* considers to be Coldwater Fishery Resources (CFRs), initiated in FY01, was continued and updated based on the 166 fish samples collected in FY02.

The Division should be contacted in the event that a waterbody does not appear on this list. This list of CFRs is useful as a screening tool to highlight sensitive environmental areas, not as a definitive list of all waters that are CFRs. Each year, as subsequent sampling results are recorded, the list of CFRs will be updated to reflect the most current information. At present, 516 named streams are included in *MassWildlife's* database of CFRs.

Anadromous Fish Investigations

In FY02 the *MassWildlife* hired three seasonal staffers to conduct the smolt production assessment in the Connecticut River tributaries and an additional six seasonal staffers to stock salmon fry and staff the fishways on the Connecticut and Merrimack Rivers. Northeast Utilities, as directed by the conditions of their new FERC hydroelectric license, hired six seasonal employees for the Holyoke fishway. *MassWildlife* supervised their activities.

General

No major malfunctions were experienced any of the fishways on the Connecticut or Merrimack rivers in Massachusetts in 2001. An American eel upstream passage facility was installed at the DSI dam on the Westfield River in West Springfield during the summer of 2001 and began operation in the fall.

The Division continued to work closely with the EOE Watershed Teams, particularly on the Westfield, Connecticut, Deerfield Rivers, as well as on the Millers, and Chicopee. The project leader attended many Westfield Team meetings, participated in both the Westfield River's and Deerfield River's public forums, and worked successfully to involve the Watershed Teams in the



Caring for fish, streams and ponds begins early.

salmon fry stocking program. The Connecticut River Team again stocked over 200,000 fry. The Westfield Team and The Westfield Watershed Association (private group) each organized a stocking day (75,000-100,000 fry each day), and the Deerfield and Millers teams also helped to organize and stock @100,000 fry each. The Westfield Team volunteered to staff the DSI fishway during the fall fish passage season (September 15-October 31), and monitored the newly installed eel passage facility from Oct 1- 31.

The project leader worked closely with the Deerfield/Millers chapter of Trout Unlimited on fry stocking, hydropower re-licensing, implementation of a trout study in the Deerfield #5 dam bypass reach, and on expanding the Atlantic salmon egg rearing program (ASERP) to 30 schools in the CT River watershed.

Connecticut River

Holyoke

The Holyoke Dam fishlift was operated for upriver fish passage from May 7 through July 6 and September 15 through November 15, 2001, except during periods of high water June 3-5. The opening was delayed from mid-April to early May due to very high water from melting snow. Seven species of anadromous fish were identified and enumerated during the spring/summer fish passage season. The number of Atlantic salmon trapped at the fishlift decreased from 50 in 2000 to 25 in 2001. Four Atlantic salmon were radio-tagged and released at Holyoke as per agreement with Northeast Utilities. One

of these salmon made it to the White River in VT, two were detected in the Deerfield River (MA), and one was located in the Mill R (Hatfield, MA). All trapped salmon not radio-tagged and released, were transported by personnel of the U. S. Fish & Wildlife Service to the Richard Cronin National Salmon Station, Sunderland, MA.

The number of American shad lifted at the Holyoke facility increased from 225,042 in 2000 to 273,220 in 2001. This continues to be below the high numbers seen during the 1980's and early 1990's. The Holyoke fishlift continues to be a major source of American shad for restoration programs in other rivers in the Northeast. A total of 1,527 shad were captured in 2001 for out-of-basin restoration and within basin restoration efforts. American shad were transported by state fisheries agencies from Massachusetts (150), New Hampshire (723), and Connecticut (654).

The number of blueback herring passing through the fishlift in 2001 remained stable at 10,604 (10,587 passed in 2000), but this is well below the runs of 500,000+ seen in mid-1980's.

The number of sea lamprey passed in 2001 was 49,277, up from the 21,036 passed in 2000.

Turners Falls

The fishladders at Turners Falls were operated from May 14 through July 2, 2001. Only minor operational problems were encountered during the season. However, the total number of shad passing through the facility remains disappointingly low. Only 1,540 shad were counted passing through the project. This equals only 0.6% percent of the total number of shad passed through the Holyoke facility. The agencies involved with the anadromous fish restoration project continue a research project directed at increasing the passage through the Cabot ladder. This project started in 1999 by monitoring PIT tagged shad in the Cabot ladder, and will continue in 2002 with the introduction of ladder modifications.

Westfield River

In 2001, a fish ladder was operated for the sixth year at the Decorative Specialties International Inc. (DSI) dam in West Springfield, MA. The fishway and associated downstream bypass facilities were constructed in the fall of 1995. An American eel upstream passage facility was installed at the DSI dam during the summer of 2001 and began operation in the fall.

The DSI fishway was operated for upriver passage from April 4 through July 9, and September 15 through October 31, 2001. Closures due to high water occurred on April 6-16, 19, 21-22, and May 24-27. Five species of anadromous fish and six species of resident fish were identified and enumerated during the spring/summer fish passage season. Passage included 2,345 sea lamprey and 4,720 American shad, a new DSI record. In addition, several species of resident fish were counted at the project in large numbers as well. The list includes

white sucker, brook and brown trout, largemouth and smallmouth bass. 465 juvenile eels (elvers) were documented passing through the new eelway during Oct. 2001.

The number of Atlantic salmon returning to the Westfield River decreased this year from 11 in 2000 to 8 in 2001. All salmon were transported by personnel of the United States Fish & Wildlife Service to the Richard Cronin National Salmon Station, Sunderland, MA. No salmon were seen during the fall passage season.

Atlantic Salmon Fry Stocking, Survival and Habitat Assessment

During spring 2001 a total of 2,137,081 Atlantic salmon fry were stocked into tributaries of the Connecticut River in Massachusetts by volunteers and members of the Americorp Program. The majority of these fish were stocked into the Deerfield River system (871,148). The Westfield River system received the second greatest number (855,594). Other smaller tributaries to the Connecticut were stocked as well. These include the Manhan, Fourmile Brook, Mill (Northampton, Hatfield, Northfield) Sawmill, and Fall Rivers. A small segment of the Millers River was also stocked. Survival of the stocked fry was estimated by electrofishing techniques. Results of fall 2000 electrofishing show that salmon were found in all waters that had been stocked in the spring. Survival into the second year of life was also demonstrated. The estimate of spring 2001 smolt production was 51,096 smolts from Massachusetts tributaries to the Connecticut River. A survey of the total amount of Atlantic salmon habitat in the tributary waters of the Connecticut in Massachusetts is now largely complete. An estimated 49,281 units (one unit equals 100 square meters of river area) of Atlantic salmon habitat have been assessed through this effort.

Merrimack River

The two mainstem dams on the Merrimack River in Massachusetts were operated and monitored for anadromous fish passage during the spring/summer of 2001.

Essex Dam

During the spring of 2001 the Essex Fishlift was operated from May 7 through July 20. During the spring of 2001 Atlantic salmon numbers (78) were down slightly from last year (85). The record number of American shad passing through the lift (76,717) was 5% greater than the previous record (72,571) set last year. River herring (1,550) decreased substantially from the number passed in 2000 (23,587). Striped bass numbers (511) decreased from 1,124 passed in 2000. Sea lamprey passage (3,665) was down significantly from the 2000 total (11,002).

Pawtucket Dam

The Pawtucket Dam fish elevator was operated from May 10 through July 7, 2001. 7,740 shad were lifted. This is down from the passage of 12,716 in 2000 and represents 10% of the shad lifted in Lawrence. River herring (58, or 3% of Lawrence passage) decreased

substantially from the number passed in 2000 (673) and remains depressed when compared to the 37,000 counted in 1989. 16 striped bass were lifted. Sea lamprey passage (606 or 16% of Lawrence passage) was less than the 2000 number (2,259). No sea-run Atlantic salmon were seen at the facility but a number of surplus broodstock from the New Hampshire sport fishery were counted in the vicinity of the lift.

Technical Assistance

As in the previous segment, the majority of technical assistance time was spent addressing fish passage issues pursuant to the FERC relicensing of the Holyoke project. The Holyoke Water Power Company (HWP) was awarded a new license to operate the Holyoke project in July of 1999 and the project was sold to the City of Holyoke and the Holyoke Gas and Electric Co. in July 2001. In 2001 the rubber dam crest was installed, the rock removal in the tailrace was completed.

Downstream passage facilities were completed on the four lowest dams on the Deerfield system (#2, #3, #4, and Gardners Falls) in 1999. These facilities began operation during the smolt out-migration in the spring of 1999 and were evaluated at that time. Deficiencies were found, corrections/modifications were made and evaluations continue in spring 2000 and 2001.

The FERC relicensing process continues at the Woronoco project on the Westfield River. Technical assistance time was spent addressing fish passage and minimum flow issues at this project. The final draft of the license application was filed in 2001 and the license should be issued in 2002.

The project leader continued to attend CRASC Technical Committee Meetings and took over as the chairman of the CRASC Shad Studies Group in 2000. The project leader also attended Merrimack Technical Committee meetings.

The project leader was actively involved with the River Restore Program, acting as *MassWildlife's* representative on the Dam Removal Triage team. This involved traveling around the state looking at, and evaluating dams that may be removed. Two dams on Yokum Brook in Becket, MA are scheduled to be removed in 2002.

Fish Kill Investigations and Environmental Review

Fish Kill Investigations

Pursuant to the 1999 Fish Kill Memorandum of Understanding between the Department of Environmental Protection (DEP), the Division of Fisheries & Wildlife (*MassWildlife*), the Division of Environmental Law Enforcement (DELE) and the Department of Food and Agriculture (DFA), *MassWildlife*, as the coordinating agency, received 32 reports of which 27 involved fish kills (9 rivers 18 ponds). Two of the five complaints not involving fish were nevertheless pollution events (oil and milk spill). Fifteen reports required field investigations: seven natural kills (low oxygen and/or stress related), two post stocking/hooks mortality, two no

dead fish found, two chemical (one discharge from a pipe, one malfunction at a WWTP), one dewatering due to opening of a dam gate, and 1 hydropower turbine. At the kills which were investigated, an estimated 1,225 fish were killed (8% game fish).

Environmental Review

There were 81 requests to review project proposals involving fisheries habitat on 71 waters (60 rivers 11 ponds) statewide. Sixty eight percent of the requests were received from environmental consulting contractors to fulfill DEP and MEPA filing requirements. The remainder of the requests were from state agencies (EOEA, DEM, and DEP) and local conservation commissions. Fisheries resources were partitioned as follows: warm water (47%), coldwater (53%) of which 15% were anadromous resources and 7% were endangered. The majority of the projects were bridge replacements or rehabilitations over streams (48%) and road reconstruction (14%). The remainder (38%) was divided between land development, habitat restoration, gas and sewer lines, lake management projects, water withdrawals, new discharges and dam removal and/or repairs. *MassWildlife* provided resource data, impact assessments, technical assistance and mitigative strategies to protect fisheries resources.

In 2002, *MassWildlife* reviewed and provided comments to MEPA, DEP and EPA on discharge permit renewals, water withdrawal permits and all major projects affecting fisheries resources published in the *Environmental Monitor*. In addition the Fisheries Section provided extensive comments to DEP/DEM on the Final Generic Environmental Impact Report *Eutrophication and Aquatic Plant Management in Massachusetts*. *MassWildlife* also provided technical information to a wide variety of consultants, town and state officials on local projects.

Warmwater Fisheries Investigations

The stocked esocid program continues to be fine-tuned as we monitor catches of northern pike and tiger muskies. Currently, each Wildlife Management District has one to three waters stocked annually with tiger muskies depending on total numbers available. For the Northeast District the primary water is Lake Mascopic, Tyngsborough which has been stocked for the last nine years and is beginning to produce legal fish. In 2002, high numbers of fish were available, so Lake Cochituate, Framingham was also stocked. In the Southeast District, South Watuppa Pond, Fall River has been stocked for the past four years and will be monitored for up to five years to determine if a fishery has been established. In the Central District, the A-1 Site and Lake Chauncey, Westborough, and Flint Pond, Shrewsbury are being actively managed. One body of water in the Connecticut Valley District, Hampton Ponds, Westfield, has been stocked for the past nine years and is producing legal fish. Hampton Ponds produced the largest tiger muskie in 1999 at 12 lb 8 oz. Pontoosuc Lake, Pittsfield in our

Western District, which has the most consistent stocking history in the state, continues to be one of the best producers. In fact, Pontoosuc Lake produced the largest tiger muskie for the third straight year. Spring and summer surpluses of northern pike and tiger muskie from the states of New Jersey, Pennsylvania and Virginia were once again made available for stocking waters of the Commonwealth. In addition to their surpluses, the Pennsylvania Fish Commission held an additional allotment of tiger muskellunge until early fall allowing MassWildlife to stock larger fish. This increases chances for fish survival, which will ultimately lead to more legal fish entering the fishery. As a result of the generosity of New Jersey and Pennsylvania, 62,771 tiger muskies were stocked into seven waters: Charles River, Medfield/Millis, Lake Chauncey, Westborough, South Watuppa Pond, Fall River, Flint Pond, Shrewsbury, Lake Cochituate, Framingham, Pontoosuc Lake, Pittsfield and Hampton

Freshwater Sportfishing Awards Program

For over 30 years, the Freshwater Sportfishing Awards program has been awarding pins to anglers who catch trophy size fish from the waters of the Commonwealth. Minimum qualifying weights are currently in place for 22 different species of fish. Upon submitting an eligible fish to an authorized weigh station (nearly 100 across the state), the angler receives a bronze pin depicting the species of fish with the weight and year of catch stamped on the back. In addition to the bronze pin, the lucky angler who weighs in the largest fish of the year for each of the categories is awarded a plaque and gold pin at the annual sportsmen's show held in February at the Worcester Centrum. 426 pins were awarded in all 22 categories for calendar year 2001. The first pin since 1990 was awarded for shad and brook trout set a single year record. In addition, a new state record (as well as world record on a tip-up) was submitted for tiger muskie.

Species	Total Pins	Gold Pin
Broodstock salmon	52	20 lbs. 6 oz.
Brook trout	64	05 lbs. 13 oz.
Brown trout	4	08 lbs. 6 oz.
Bullhead	25	02 lbs. 8 oz.
Carp	10	36 lbs. 13 oz.
Chain pickerel	39	06 lbs. 15 oz.
Channel catfish	15	19 lbs. 4 oz.
Crappie	9	02 lbs. 11 oz.
Lake trout	14	14 lbs. 8 oz.
Landlocked salmon	0	NA
Largemouth bass	15	08 lbs. 7 oz.
Northern pike	22	26 lbs. 9 oz.
Rainbow trout	14	06 lbs. 0 oz.
Shad	1	05 lbs. 2 oz.
Smallmouth bass	27	06 lbs. 7 oz.
Sunfish	9	01 lbs. 8 oz.
Tiger muskellunge	5	27 lbs. 0 oz.
Tiger trout	4	03 lbs. 12 oz.
Walleye	1	05 lbs. 11 oz.
White catfish	15	07 lbs. 3 oz.
White perch	43	02 lbs. 4 oz.
Yellow perch	38	02 lbs. 2 oz.

Ponds, Westfield. The majority of these tigers (93%) were summer surplus fish, however, and were less than six inches long. As with tiger muskies, the process for narrowing the list of waters stocked with northern pike continues. Spring surpluses from New Jersey, Pennsylvania and Virginia resulted in 52,647 northern pike stocked into six waters: Charles River, Medfield/Millis, A-1 Site and Lake Chauncey, Westborough, Flint Pond, Shrewsbury, East Brimfield Reservoir, Brimfield and Shaw Pond, Becket. As with the tiger muskies, most (76%) of the northrens were spring surplus fish which were less than six inches in length.

Bass Tournament Creel Analysis

The Fisheries Section is monitoring the results of black bass tournaments (largemouth and smallmouth bass) to help establish a long term database of variables such as catch rates and average fish size for specific waters. Any organization which requests the use of a Public Access Board (PAB) facility (mainly boat ramps) to hold a fishing event must obtain a Special Use Permit. As part of the permit, the PAB includes a creel sheet to be completed by the fishing club at the close of the event. The creel sheet is then mailed to the Warm/Coolwater Project Leader at the Field Headquarters. The creel seeks the following information: club name, date of event, location of event, start and end time, number of anglers, number of anglers weighing bass, number of anglers with limits of bass, total number of bass weighed in by species, total bass over 5 pounds, number of bass returned alive by species, total weight, winning weight and the weight of the biggest bass of the event. There is also room for the club to include comments. This information is entered into a database to allow the biologists to detect long terms trends in the bass populations in some of the Commonwealth's most heavily fished waters. Creel sheets are still being received for the 2002 fishing season, so results from the 2001 season will be presented here.

In 2001, a total of 171 creel sheets were sent in to the Field Headquarters. These 171 tournaments represented 49 different bass clubs fishing on 43 different waters. The average size of a tournament was 40 anglers with a



Jim Lambert with his world record Pontussuc tiger muskie: 27 pounds, 46 inches.

high of 88 anglers. A total of 7,336 largemouth bass and 1,154 smallmouth bass were weighed in for a catch rate of approximately of 1 bass per 3 + angler hours. The average weight of a bass weighed in was 1 lb 4 oz. 85% of all anglers weighed at least one bass while 35% caught a limit (5 bass total of either species). Over 97% of all bass were returned to the waterbody alive at the close of the tournaments. Webster Lake, Webster produced the highest number of bass over 5 pounds (11), while Wequaquet Lake, Barnstable produced the highest number of anglers weighing fish (98%) and South Watuppa Pond, Fall River produced the highest number of anglers with limits (61%). John's Pond, Mashpee produced the highest average winning weight of bass (16 lbs. 12 oz.). A breakdown of the number of tournaments by waterbody revealed that most waterbodies host only a few tournaments a year (less than 6) while the two highest occurrences took place on the Connecticut River and Congomond Lakes, Southwick which hosted

15 and 23 respectively. Over time, this data will aid in monitoring the status of this important fishery.

Hatchery Trout Program

Trout produced in *MassWildlife's* hatcheries were stocked in nearly 500 different water bodies across the Commonwealth during the fall and spring stocking seasons. A total of 437,913 pounds of trout, numbering 628,393 brook, brown, rainbow and tiger trout were produced at the trout hatcheries in FY2002 (Tables 1 and 2). Fall stocking included a total of 44,099 rainbow trout between 9 and 14+ inches and 45,700 brown trout between 9 and 12+ inches. More trout than normal were stocked in the fall due to the severe drought conditions that occurred during the spring, summer and fall. Reduced water levels from springs at Sunderland and Montague Hatcheries necessitated the release of fish that otherwise would have held through the winter for spring stocking. Additionally, no trout were stocked

2002 FISH PRODUCTION

Table 1. Summary of the number of trout produced and stocked from each of the Division's four trout hatcheries in FY2002.

Species	Size Cat. (inches)	Number of fish				Total No. of Fish
		Bitzer	McLaughlin	Sunderland	Sandwich	
Rainbow Trout	6 - 9	0	0	0	0	0
	9+	0	0	17449	0	17449
	12+	15000	37960	54955	37675	145590
	14+	21550	183139	0	4000	208689
	18+	0	0	0	0	0
	Sub-total	36550	221099	72404	41675	371728
Brook Trout	6 - 9	13950	0	0	300	14250
	9+	0	0	35750	0	35750
	12+	8000	0	6618	17640	32258
	14+	500	0	0	0	500
	18+	0	0	0	230	230
	Sub-total	22450	0	42368	18170	82988
Brown Trout	6 - 9	0	35100	0	800	35900
	9+	0	0	63800	0	63800
	12+	30900	0	33850	2225	66975
	14+	0	0	0	0	0
	18+	0	0	0	252	252
	Sub-total	30900	35100	97650	3277	166927
Tiger Trout	6 - 9	0	0	0	0	0
	12+	0	0	0	0	0
	14+	0	0	0	6750	6750
	18+	0	0	0	0	0
	Sub-total	0	0	0	6750	6750
Total		89900	256199	212422	69872	628393

Table 2. Summary of the weight of trout produced and stocked from each of the Division's four trout hatcheries in FY2002.

Size Cat. Species	(inches)	Weight of fish (lbs)				Total Wgt. of Fish
		Bitzer	McLaughlin	Sunderland	Sandwich	
Rainbow Trout	6 - 9	0	0	0	0	0
	9+	0	0	6792	0	6792
	12+	10476	22943	34311	33132	100862
	14+	26216	170044	0	3948	200208
	18+	0	0	0	0	0
	Sub-total	36692	192987	41103	37080	307862
Brook Trout	6 - 9	4142	0	0	33	4175
	9+	0	0	10098	0	10098
	12+	5754	0	5442	12354	23550
	14+	1100	0	0	0	1100
	18+	0	0	0	611	611
	Sub-total	10996	0	15540	12998	39534
Brown Trout	6 - 9	0	5508	0	123	5631
	9+	8901	0	16296	0	25197
	12+	23793	0	24878	1713	50384
	14+	0	0	0	0	0
	18+	0	0	0	900	900
	Sub-total	32694	5508	41174	2736	82112
Tiger Trout	6 - 9	0	0	0	0	0
	12+	0	0	0	0	0
	14+	0	0	0	8405	8405
	18+	0	0	0	0	0
	Sub-total	0	0	0	8405	8405
Total		80382	198495	97817	61219	437913

Table 3. Summary of landlocked salmon and Atlantic salmon produced at the Roger Reed Hatchery in FY2002.

Species	Size Category (inches)	Number	Weight (lbs)
Landlocked salmon	smolts (8+)	13800	3424
	Total	13800	3424
Atlantic salmon	green eggs	1788000	
	unfed fry (1+)	1100000	350
	adults (15+)	425	3400
	Total	2888425	3750

from McLaughlin Hatchery during the fall of 2001 due to the reduced number of fish that were grown at McLaughlin Hatchery. This action was necessary because of the raceway resurfacing project that took place during the spring and summer of 2001. During the spring stocking season (late February until the end of May) a total of 538,594 brook, brown, rainbow and tiger trout were stocked.

MassWildlife's goal is to have at least 50% of the stocked trout be 12 inches or better. This goal was met once again in FY2002 with 73.4% of the trout that were stocked being 12 inches or longer. A total of 461,244 brook, brown, rainbow and tiger trout that averaged more than 12 inches or longer was stocked by the Division in FY02.

Each of the four trout hatcheries produced some great fish in FY02. McLaughlin Hatchery produced more than 183,000 rainbow trout that averaged more than 14 inches long. Sandwich Hatchery produced more than 6,700 tiger trout that averaged more than 14 inches long and weighed an average of 1.25 pounds apiece. Tiger trout are a cross between a brook trout male and brown

trout female. They get their name from the tiger-like stripes on their backs. Tiger trout have become a popular fish among Baystate anglers because of their beauty and strong fight. Sunderland, Montague and Sandwich Hatcheries combined produced more than 32,000 two-year-old brook trout. Two-year-old brook trout are difficult to produce in large numbers.

The Roger Reed Hatchery in Palmer continued its key roles in the Atlantic salmon restoration program and the landlocked salmon program for Quabbin Reservoir in FY2002. A total of 13,800 landlocked salmon smolts were produced and stocked into Quabbin Reservoir. A total of 1.79 million Atlantic salmon eggs were collected from broodstock held at the station and distributed among cooperating hatcheries in New England. A total of 1.1 million unfed Atlantic salmon fry were also produced and stocked into rivers and streams in the Connecticut River drainage basin within Massachusetts. In addition, 425 adult broodstock salmon were stocked in selected waters across the Commonwealth. A summary of the numbers of each of the fish species produced by the Roger Reed Hatchery is in Table 3.

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The Wildlife Section oversees research and management of all avian and mammalian species which are utilized in any way for meat, fur or sporting purposes. The wildlife section has a staff of eight wildlife biologists who conduct research and management projects throughout the state with assistance from District personnel and in cooperation with the U.S. Fish & Wildlife Service and the Massachusetts Cooperative Fish & Wildlife Research Unit (USGS).

Migratory Bird Census

Mourning Dove Census: The number of calling doves on three long-term survey routes increased 17% from 2001 to 2002. Counts on eight comparable routes increased 43% over the same period.

Woodcock Census: Results of the fall 2001 hunting season as measured by the woodcock wing-collection survey indicated that the average bag per hunt and per season was down approximately 15% and 8% respectively when compared to the previous season. Production of young, which is measured as a ratio of immatures per adult female, was down 19% when compared to the long-term average. Eleven randomized spring woodcock singing ground surveys were conducted in 2002. The total number of singing woodcock increased 85% from 200 -2002.

Waterfowl Research and Surveys: Preseason banding efforts were hampered by a number of factors, limiting the number of launches to 13 instead of the 20 to 25 nights customarily worked. Attempts to solve the mechanical problems which had limited boating success last year, delayed the start of airboating until August 13. This delay required dropping some of the sites normally checked early in the season. Theft of the truck winch caused us to drop another site where the winch was required. A bogged down trailer, and events of Sept. 11 further limited airboating and then on Sept. 14, the trailer axle was bent when a rock rolled off a stone wall and into the road, effectively ending the season at a time when we normally have our greatest success. In total, only 516 birds were banded. This included 343 wood ducks, 151 mallards, 7 black ducks, and 5 greenwinged teal. Miscellaneous species comprised the remainder of the catch.

During September 4-25, Massachusetts conducted a resident Canada goose season. The state permit requirement was dropped, replaced by the newly implemented Migratory Bird Hunter Harvest Information Program (HIP). The U.S. Fish and Wildlife Service estimated a

September season harvest of 2,300 geese. This compares to a harvest estimate of 4,100 last year and 6,200 in 2000.

Duck hunting seasons in the Atlantic Flyway continued with the liberal option of 60-day seasons and a six bird bag limit. There was also a 45-day/2-bird bag Canada goose season in the Central and Coastal waterfowl hunting zones. In addition, the season in the Berkshire zone was increased from a 15 day/1 bird bag during November last year to a 30 day/2 bird bag that was allowed to begin the last Saturday in October. This was the third regular season of goose hunting allowed in that region since 1995; a season made possible by increasing numbers of Canada geese in northern Quebec.

The annual midwinter coastal waterfowl inventory was flown between the 12th and 18th of January 2002. For the second year *MassWildlife* contracted out the survey to the U.S. Fish and Wildlife Service and an independent observer. A *MassWildlife* employee accompanied the crew as a trainee. In all, 108,578 waterfowl were counted. Black duck numbers were up 41% from 2001 but 2% below the 10-year average. Mallard counts (4,973) were 58% higher than last year and 59% above the 10-year average. Scaup numbers were well above last year (254%) and 63% above the 10-year average. Similarly, counts of bufflehead, goldeneyes, and mergansers were all higher than average. All sea duck counts were higher than last year and although eiders were 4% above average, scoter numbers remained below the 10 year average (-70%). Atlantic brant numbers were 38% higher than 2001 and nearly double the 10 year average. Canada geese and mute swans were up slightly over last year and similar to the 10 year average.

Between January 15 and February 9, 2002, Massachusetts held a late, resident Canada goose season in the Central waterfowl zone and that portion of the Coastal zone north of Duxbury. No permits were required this year for the same reasons that permits were dropped for the September season. The USFWS estimated a harvest of 3,000 birds compared to 4,600 last year and 2000 the previous year.

During April and May we participated in the Northeastern states waterfowl breeding survey which is based on sampling randomly selected 1 kilometer square plots. Massachusetts checked 93 of the 1,487 plots used in the survey. Eleven states participated in the 2002 breeding pairs survey for waterfowl. The population estimate for mallards was 400,989 pairs + 52,143. The estimate for black ducks was 28,969 pairs + 7,136; wood ducks, 202,157 pairs + 35,868, and Canada geese, 406,051

pairs + 62,909. Data from this survey is used to set hunting season regulations tailored to the Atlantic Flyway.

MassWildlife's biologists continued to check nest boxes on 51 sites used by *MassWildlife* to monitor wood duck populations statewide. Summer checks revealed 309 wood duck nest starts in 603 available boxes, with 249 successful hatches (80%). In addition, there were 67 hooded merganser hatches from 77 starts. The number of wood duck hatches decreased 11% from last year while the number of hooded merganser hatches increased by 31%.

Massachusetts participates in the Atlantic Flyway Resident Goose Banding Program. This program is designed to band 1% to 2% of a state's breeding Canada goose population. Geese are captured by round ups during the summer molt. A total of 1,031 Canada geese were banded at 72 sites in 68 towns in Massachusetts. The total included 476 goslings and 555 adults. An additional 143 geese banded previously were recaptured.

Massachusetts entered its fifth year of the new federal Migratory Bird Hunter Harvest Information Program (HIP). HIP replaces the present survey system which is based on collecting names of duck stamp buyers at post offices. HIP is more efficient and will allow the U.S. Fish and Wildlife Service to carry out more specialized surveys of hunting activity as regards various migratory bird species. Waterfowl and woodcock hunters register to obtain HIP numbers each time they buy a new license by calling a 1-800 number. This year, hunters were also able to register on-line through the state's new internet registration system.

This was the first year that the Lackey Pond dam was in full service. Marsh vegetation regenerated more rapidly than expected, providing good waterfowl habitat for the first time in more than a decade. This was borne out by airboat nightlight banding efforts. We banded 90 birds, including 82 wood ducks, up from 14 ducks last year, the first season after reflooding. The Lackey Pond Dam restoration was a cooperative project involving several groups and was funded through Ducks Unlimited, Inc.'s M.A.R.S.H. program.

Bobwhite Quail Census: An inventory of bobwhite quail populations in southeastern Massachusetts is conducted every other year by roadside whistle count. The 2001 weighted call indices for Bristol and Plymouth counties showed no significant difference from those for 1999. However, the Barnstable county whistling index and that for the statewide total were significantly lower than in 1999. The 2001 indices for all three counties and for the statewide total were not significantly different from the five-year (1991-99) mean index.

Cottontail Rabbit Survey: Sportsmen and others were solicited to provide specimens of cottontail rabbits to aid in ascertaining the statewide distribution of Eastern and New England cottontails. A total of 199 specimens

was received in 2001-02. Examination of these specimens is underway. The survey will be continued in 2002-03.

Pheasant Program

A total of 40,000 pheasants were stocked by *MassWildlife* personnel during fall 2001. All pheasants were purchased from private game farms in New York and Massachusetts. In addition, 7,000 six to eight week old chicks were purchased and distributed to sporting clubs to be raised and liberated into public covers during the 2001 hunting season. The Southeast District personnel also stocked 3,500 adult bobwhite quail.

Pheasants released for hunting were distributed (approximately) as follows:

Southeast District:	8,000
Northeast District	5,000
Central District:	13,000
Connecticut Valley District:	10,000
Western District:	4,000

Wild Turkey

Wild Turkey Range and Harvest Evaluation

The 12th modern-day, fall, either-sex turkey season was held from October 29 to November 3, 2001. The zone included all of Berkshire, Dukes, Franklin, Hampden, and Hampshire counties and a portion of western Worcester County. A total of 228 turkeys was taken including 71 (31%) in Franklin County, 55 (24%) in Berkshire County, 45 (20%) in Hampshire County, 29 (13%) in Hampden County, 27 (12%) in the open portion of Worcester County, and 1 (<1%) in Dukes County. Birds taken were 29 adult males, 90 immature males, 18 adult females, 57 immature females, 33 unaged females, and 1 unaged male.

The 23rd Massachusetts spring gobbler hunt was held in April-May 2002. The season framework was the same as in 2001. The 4-week open zone included Berkshire, Essex, Franklin, Hampden, Hampshire, Middlesex, and Worcester counties. The 2-week zone included Barnstable, Bristol, Norfolk, and Plymouth counties. A record total of 14,017 permit applications was received. A harvest of 2026 turkeys was attained (the 11th straight year over 1000 and the 4th over 2000). There were 282 persons (2.0%) who took their second bird in the bag, as compared to 347 persons (2.7%) in 2001. The overall estimated success rate for taking 1 turkey was 12.4% as compared to 14.2% in 2001. The Worcester County harvest was 603 (29.7%), followed by Berkshire (399, 19.7%), Franklin (340, 16.8%), Hampshire (229, 11.3%), Hampden (188, 9.3%), Plymouth (91, 4.5%), Essex (65, 3.2%), Middlesex (48, 2.4%), Bristol (42, 2.1%), Norfolk (16, 0.8%), and Barnstable (5, 0.2%). Adult males comprised 888 (44%) of the take, as compared to 1321 (61%) in 2001.



Black Bear

Black Bear Distribution and Harvest Investigations

A total of 2181 bear hunting permits were issued for the 2001 hunting season. A near-record 104 bears were taken during the 23-day split season, including 99 during the 23-day September segment and 5 during the 6-day November segment. Forty-four males and 60 females were taken in Berkshire (n=36), Franklin (n=30), Hampshire (n=21), and Hampden (n=17) counties. There were 16 non-hunting mortalities (11 in 2000-01) including 7 road kills, 5 depredation kills, 3 illegal kills, and 1 unknown (found dead). One hundred forty seven (147) problem bear complaints were received (84 in 2000-01) primarily including 43 residential complaints, and 17 trash and campground complaints. Additional untallied, but substantial, complaints were received by the Division of Law Enforcement and local officials.

The black bear field study conducted by the University of Massachusetts (in cooperation with DFW) was shifted to *MassWildlife* in 1999. Twelve radio-collared bears were active in July 2001. One was killed illegally in August 2001, four were killed legally in the September 2001 hunting season, and one slipped its collar in October 2001. During winter 2002, the six remaining bears were tracked to their winter dens. Three bears were successfully captured (1 with newborn cubs, 1 with yearlings, and 1 which was pre-reproductive). The other three bears were active and were not captured. No bears were captured during barrel trapping from April to July 2002.

Furbearer Program

The furbearer program is responsible for the management and research relating to fourteen species of wildlife in the Commonwealth. This group of species called furbearers includes beaver, muskrat, bobcat, eastern coyote, red and gray fox, river otter, fisher,

striped skunk, mink, long-tailed and short-tailed weasel, raccoon and opossum.

Massachusetts' furbearers are abundant and widely distributed throughout the state. Populations of these species are managed scientifically and are secure. None are threatened or endangered. The value of the Commonwealth's furbearer resource is very diverse and provides economic, ecological, cultural, biological, aesthetic and educational opportunities to individuals in the state.

The furbearer management program presents many challenges to wildlife managers in the state and uses various options including habitat manipulation, public education and regulated hunting and trapping as tools in the management of these renewable resources in the Commonwealth. A combination of techniques is used to:

1. Control problem animals
2. Regulate wildlife populations
3. Reduce habitat degradation
4. Reduce crop and property damage
5. Aid in the recovery of endangered species
6. Allow a sustainable harvest of renewable furbearer resources.

In addition, these activities provide recreational and economic opportunity for citizens of the state. During this past fiscal year citizens spent more than 1,700 days afield harvesting and viewing furbearer resources. A total of 3,077 furbearers were harvested in the 2001-2002 season. The harvest by species was 1170 beaver, 18 bobcat, 91 coyote, 197 fisher, 38 river otter, 36 red fox, 50 gray fox, 399 raccoon, 49 mink, 60 skunk, 52 opossum, and 917 muskrat.

Regulated trapping is an important component of wildlife management programs. It is the most feasible and effective method to control wildlife population growth. Regulated trapping conducted by a trained, licensed public is used by wildlife professionals to regulate wildlife populations and therefore reduces negative effects associated with high wildlife populations. Residents of the state derive financial savings due to decreased amounts of property damage caused by furbearers, and by diminishing the need to pay wildlife control agents.

The Massachusetts Division of Fisheries and Wildlife regulates the harvest of furbearing animals through complex laws and regulations that govern trapping. They include:

1. Mandatory licensing of trappers
2. Mandatory trapper training
3. Restrictions on the size of traps
4. Restrictions on types of traps
5. Restricted seasons for trapping
6. Restricted areas for trapping
7. Mandatory regular checking of traps

8. Mandatory tagging of traps to identify the owner.

Management and Research Efforts

Pelt sealing: Affixing a seal to all pelts taken in Massachusetts is required by law. This “sealing” process provides biologists with information on the statewide harvest and distribution of beaver, otter, red fox, gray fox, bobcat, coyote, mink, and fisher. During the 2001-2002 harvest season, *MassWildlife* biologists sealed 1649 pelts. In addition biological information is gathered on the sex, age, and reproductive status of selected species. The Division collected and processed 253 specimens for laboratory examination during the 2001-2002 season.

Wetland/beaver management: In November, 1996 a Ballot Referendum known as “The Wildlife Protection Act” or “Question One” was approved by voters in Massachusetts during the general election. This statute modified existing laws that regulated lawful traps for use with certain species of wildlife. Beavers are prolific rodents that occasionally cause problems to public and private property. A consequence of the trapping restrictions was decreased harvest of beaver during the regulated trapping season and a concomitant increase in the statewide population.

Between 1996 and 2000, the beaver population tripled and complaints about flooding increased. Typical complaints included: flooding of septic systems, wells, roads, driveways and railroad tracks. In July 2000 the Massachusetts Legislature passed, and the Governor signed, a new law that modified the restrictions on beaver and muskrat traps to provide relief for people suffering from the impact of flooding caused by beaver or muskrat. An emergency permitting system was created at the town level with certain non-emergency permits for specific traps available from *MassWildlife*.

MassWildlife has developed brochures that explain options to landowners discussing the positive and negative aspect of beaver activities, associated wetland values and overall management of beaver. The newest brochure is a “sister-document” to the *Beavers in Massachusetts* booklet that explains the use of water flow devices to address flooding problems caused by beaver. The new brochure has been distributed to libraries throughout the Commonwealth and is provided to the public without charge. Public education, regulated harvest, and the installation of flow devices are major components of this program. *MassWildlife's* management goals for beaver include managing beaver for their wetland values, regulating beaver populations within available habitat and minimizing economic damage to public and private property by beaver.

Wildlife Depredation and Damage: *MassWildlife's* personnel responded to complaints about the loss of domestic livestock and pets to eastern coyotes, red foxes and gray foxes. Site visits were conducted and technical advice given in an attempt to eliminate or alleviate damage situations. Coyotes currently occur in

all communities in Massachusetts except Martha's Vineyard and Nantucket. Complaints regarding eastern coyotes have come from more than 340 separate towns in the Commonwealth since 1990. Complaints range from coyotes killing livestock, and poultry, harassing pet dogs and cats, to coyotes on airport runways threatening the arrival and takeoff of aircraft.

Wildlife Welfare - Disease Program: Furbearer program personnel have been monitoring an outbreak of rabies in raccoon populations along the eastern seaboard since 1977. This epizootic was documented in Massachusetts on September 16, 1992. The die-off of raccoons from this epizootic has been tremendous. The outbreak has peaked in the Commonwealth and has reduced the raccoon population significantly.

Currently rabies has been confirmed in 313 (89%) towns in Massachusetts. The geographic distribution of the outbreak now covers all of the Commonwealth except Cape Cod, Martha's Vineyard and Nantucket Island. From September 1992 - June 2002, 3,495 animals including, 2,111 raccoons, 1096 skunks, 70 woodchucks, 81 foxes, 99 domestic cats, 12 cattle, 4 domestic dog, 6 coyote, 2 otter, 2 fisher, 1 deer, and 11 others tested positive. *MassWildlife* developed informational brochures on zoonotic diseases that have been incorporated into trapper education training and are available to the public.

White-tailed Deer Program

The 2001 harvest of 9,930 deer was the fourth highest on record which included a record archery harvest of 2,914 (Table 1). Overall, there was a 12% decrease in harvest from the 2000 hunting season. Currently, we estimate 45,000 to 50,000 deer hunters in Massachusetts, with 20,000 ñ 22,000 archers and 17,000 — 19,000 muzzleloader hunters. Since 1966 when the Division of Fisheries and Wildlife first required deer harvest registration, harvest from the archery season has been increasing, currently 30% of the total harvest, while the harvest from the shotgun season has been steadily decreasing and harvest from the muzzleloader season has remained stable (Figure 1). We estimate the deer population statewide to be between 85,000 to 95,000. Densities range from 10-12 deer/mile² in western Massachusetts to over 50 deer/mile² on Nantucket in eastern Massachusetts.

This was the 3rd year of the 6 week archery season in Deer Management Zones (DMZ) 9 through 14, and the 2nd year of an unlimited bag limit on antlerless deer in the eastern DMZs 10 through 14. In DMZs 9-14, during the 1st three weeks of the season 53% of the harvest was antlerless deer, while the last 3 weeks of the season only 38% was antlerless. This is a decrease from 57% and an increase from 37% during the same two periods of the 2000 season. It appears that archers can be effective in targeting antlerless deer if given the opportunity and incentive to do so (Figure 1). The total number of antlerless deer harvested in suburban eastern Massachu-

Table 1. The 2001 White-tailed Deer Harvest by Season and Sex/Age Class.

Season	Antlered Male	Female	Male Fawn	Unknown	Total	% of Harvest
Paraleptic	1	1	2	0	4	0%
Archery	1797	850	252	15	2914	30%
Shotgun	2972	2404	677	4	6057	61%
Muzzleloader	318	436	99	1	854	9%
Subtotal	5088	3691	1030	20	9829	
Quabbin	42	52	7	0	101	
TOTAL	5130	3743	1037	20	9930	

setts (DMZs 10-14) exceeded the number of antlered deer (Table 3), and archery season accounted for 14% to 46% of the total harvest (Table 4) in the DMZs with the higher percentages in eastern Massachusetts.

Non Harvest Mortality

A survey of police departments in all of the Commonwealth's 351 towns was conducted to determine the situation with regard to roadkill deer. All police departments were asked about the number of roadkill deer reported for 1999 and 2000. They were further asked to indicate any hunting restriction or firearm discharge bylaw that the town may have in effect. Police departments from 268 towns returned the survey (76.4%) with 241 providing usable information (Table 2). The total number of roadkills was 2,128 and 2,362 for 1999 and 2000, respectively. Of the 241 towns, 89 did not have any restrictions in place while 152 had some form of hunting or discharge restriction. Results from the survey indicate that less than 20% of roadkill deer are reported to *MassWildlife*.

Regulation Changes for 2002

1. The Deer Management Zone 12 boundary changed to the Cape Cod Canal from Routes 44, 58 and 28. Plymouth, Carver and Wareham and a small portion of Bourne is now included in DMZ 11.
2. The Archery Deer Hunting Season in Deer Management Zones 1 through 8 was increased by three weeks standardizing the length of the archery season throughout the state.
3. The Muzzleloader Deer Hunting Season was lengthened from the current six days in December (starting on the 3rd Monday after Thanksgiving) to a period starting on the 3rd Monday after Thanksgiving and ending on the last legal hunting day of December.
4. Hunters were required to have an antlerless deer permit to take an antlerless deer in any season statewide. In future each antlerless deer permit will have a tag attached and there will be increases the bag limit in all DMZs.

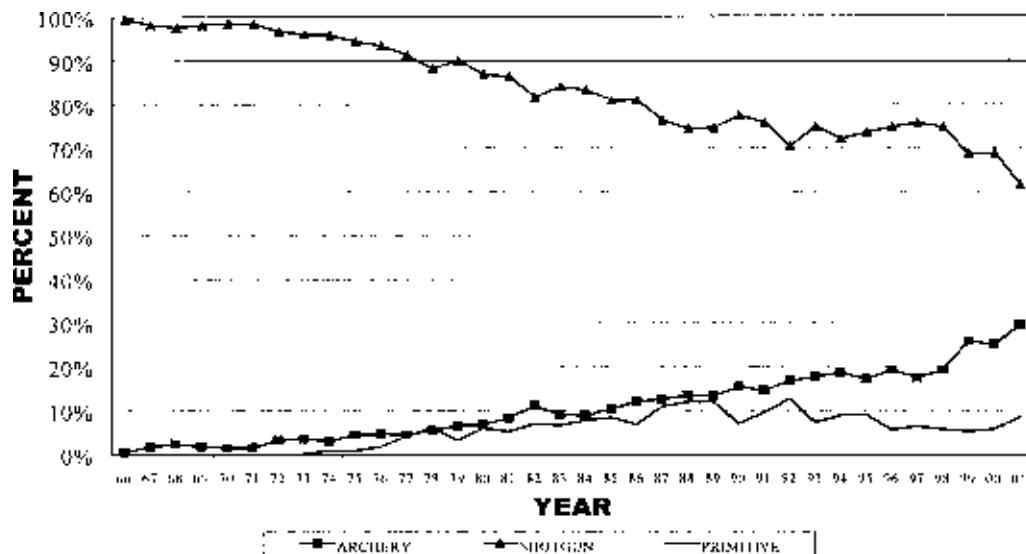
Figure 1. Massachusetts Deer Harvest by Season Represented as a Percentage of Total Harvest from 1966 — 2001.

Table 2. Number of Roadkill Deer Reported by Police Departments by Type of Town Hunting Restriction in 1999 and 2000 from a Mail Survey conducted in late 2001.

	Towns	Year		Total
		1999	2000	
No Restrictions	89	647	748	1395
Restrictions	152	1481	1614	3095
TOTAL	241	2128	2362	4490

Table 3. White-tailed Deer Harvest by Sex/Age Class and Deer Management Zone for 2001.

DMZ	Antlered Male	Female	Male Fawn	Unknown	Zone Total
1	177	92	26	1	296
2	279	28	7	1	315
3	467	330	67	1	865
4N	265	69	22	0	356
4S	179	66	25	0	270
5	374	215	43	1	633
6	104	64	13	0	181
7	318	283	70	0	671
8	485	388	98	0	971
9	428	332	101	0	861
10	637	585	179	0	1401
11	807	718	191	1	1717
12	181	162	46	0	389
13	193	183	74	0	450
14	192	176	68		436
Unknown	2	0	0	15	17
STATE TOTAL	5088	3691	1030	20	9829

Table 4. Massachusetts Deer Harvest by Season and Deer Management Zone for 2001.

DMZ	Parapelegic	Archery	Shotgun	Muzzleloader	Total
1	1	83	192	20	296
2	0	95	196	24	315
3	3	162	629	71	865
4N	0	100	235	21	356
4S	0	80	160	30	270
5	0	121	389	123	633
6	0	39	110	32	181
7	0	153	482	36	671
8	0	141	748	82	971
9	0	251	508	102	861
10	0	648	617	136	1401
11	0	704	932	81	1717
12	0	107	237	45	389
13	0	117	297	36	450
14	0	97	324	15	436
Unknown	0	16	1	0	17
TOTAL	4	2914	6057	854	9829

Research

We are continuing with research to determine cause specific mortality for deer in two study areas in north-east and western Massachusetts. Biologists radio-collared eight deer in the western study area during the 2002 field season. An additional nine deer were captured in the northeast study area during this period. Currently, there are 48 deer radiomarked in Massachusetts with 26 in the west and 22 in the east. We will shift our capture effort and include a new study area in central Massachusetts for the 2003 field season while adding only a few new animals to the sample in both the eastern and western locations. The deer in the northeast have been marked for three hunting seasons and hunting has accounted for <25% of total annual mortality. In western Massachusetts, one deer was harvested during the archery season in 2001. Chris Gaughan, graduate student conducting this study through the University of Massachusetts, Amherst, will complete his project in February of 2003.

In general, the white-tailed deer herd in Massachusetts is in excellent condition and has reached projected density goals in most areas, exceeding the goals in several areas. The Division has taken a proactive approach to deer management and will try to address conflicts before they arise and while they are still manageable. This should increase opportunities for Massachusetts deer hunters and enhance the high value placed upon white-tailed deer by the public at large.

Forestry Program

The Forestry Program is a component of the *MassWildlife* Biodiversity Initiative, which seeks to maintain and restore the diversity of native flora and fauna through active land management. The Forestry Program focuses on creating a distribution of successional stages (from early-seral to late-seral forest) in a landscape context that will maintain biological diversity.

Objectives of the forestry program are:

- 1) To build a forest inventory database, prepare a forest cover-type map using the Massachusetts Geographic Information System (MASS-GIS), and establish property boundary lines in the field for each wildlife management area (WMA).
- 2) To use inventory data to design and carry out both commercial forest cutting operations and non-commercial management activities that maintain biological diversity.
- 3) To conduct biological monitoring to determine the response of wildlife populations to forest cutting operations.

The Forestry Program leader and two full-time foresters conduct commercial cutting operations in compliance with *MassWildlife's* forest management guidelines. The guidelines provide a sequential checklist of steps for each sale to insure that landscape conditions are as-

sessed, and that management activities reflect landscape conditions. Prior to any cutting operation, *MassWildlife's* foresters consult with District staff to address local access and aesthetic issues, and with personnel from the Natural Heritage & Endangered Species Program to conserve state-listed species and priority natural communities on WMA's. All forest management activities receive permits from the Department of Environmental Management under the Massachusetts Forest Cutting Practices Act.

Forest Certification

In May of 2002, the three land managing agencies within the Massachusetts Executive Office of Environmental Affairs (DEM, MDC, and DFW) entered into a contract with Scientific Certification Systems (SCS) of California to conduct an independent, third party review of forest management practices on state-owned forestlands. The review will determine whether or not *MassWildlife's* forest management practices meet ecological, economic, and social criteria for sustainable management as defined by the international, non-profit Forest Stewardship Council (FSC). Forestry Program personnel compiled numerous background documents requested by SCS during June of 2002 to facilitate the review process. A comprehensive field evaluation of *MassWildlife's* management practices is scheduled for August, 2002, and a final decision of the potential award of a certificate of sustainable forest management is expected in January, 2003.

Forest Inventory & GIS Mapping

MassWildlife's foresters completed an accuracy assessment for a landcover mapping effort on 120,000 acres in the Connecticut Valley District and Western District in FY02 (accuracy assessment work was conducted on 200,000 acres including a pilot area of the Central District, followed by the Northeast and Southeast Districts, and the balance of the Central District in FY-2001). Accuracy assessment of the landcover mapping effort is based on the random selection of sufficient interpreted polygons to provide an 80% confidence interval. Polygons are selected proportionate to their level of occurrence by community types. A greater number of polygons are selected for relatively common community types e.g. northern hardwood forest, than for relatively uncommon types e.g. kettlehole bog. Once the number of polygons per community type is established, individual polygons are selected randomly from all polygons of that type. A total of 918 polygons, including 630 forested polygons and 288 non-forested polygons were sampled in the field as part of the overall accuracy assessment.

Five random sample points were selected within each forested polygon, and one random sample point was selected within each non-forested polygon chosen for assessment. Observers used GPS units to traverse to and between points, and subsequently made note of an observed cover type in all polygons, plus a development stage and canopy density for each forested polygon. All



A cable skidder removes timber and firewood as part of a project to create early seral forest habitat.

cover types used in this mapping effort were adapted from the Draft Natural Community Types of Massachusetts (MA Natural Heritage & Endangered Species Program).

Forest Cover Types

The most general level of forest interpretation uses three broad classes of forest: hardwood, softwood, and mixed hardwood/softwood. At this general level, both users’ and producers’ accuracy was 89.3% (Table 5). The majority of error at this general level of interpretation involves misidentification of mixed stands as either pure softwood or pure hardwood. A mixed stand occurs when both hardwood and softwood trees comprise >25% of the forest overstory. For example, a stand with 70% softwood and 30% hardwood is mixed, but such stands can appear to an interpreter to be pure softwood when using spring photography with limited hardwood leafout.

A more detailed level of forest interpretation used 18 cover types. Across all 18 forest cover types, initial users’ and producers’ accuracy was only about 60% (Table 6). For land managers using the forest cover type map, it is important to know where error in interpretation among forest community types occurred, and how serious the error was. The most common method for determining where interpretation error occurs, and how serious the error is, involves the application of a “fuzzy” ranking system, where the degree of error is related to the degree

of similarity between forest cover types. If the community type is misidentified but the incorrect type is similar to the actual type (e.g. northern hardwoods vs. mixed northern hardwoods) the degree of error is relatively low. When an incorrect type is less similar to the actual type (e.g. northern hardwoods vs. central hardwoods) the degree of error is higher.

MassWildlife evaluated four levels of error. Level I errors are the least serious, and occur between two similar cover types, both of which occur in the same general forest class (e.g., a stand of Central hardwoods is mistaken for a stand of mixed Central/Northern hardwoods). Any level I error is correct within both the hardwood/softwood/mixed, and upland/wetland contexts. A level II error occurs between two similar cover types that are not within the same general forest class (e.g., a stand of Central hardwoods is mistaken for a mixed stand of Central hardwoods/white pine). A level III error occurs when two mistakes in interpretation occur at the same time (e.g., a stand of pure Central hardwoods is mistaken for a stand of mixed Central hardwoods/Northern hardwoods/white pine). Level IV errors are the most serious, and include misinterpretation of hardwood forest as softwood forest, or vice versa.

MassWildlife determined that the utility of the landcover map for identifying and prioritizing forested stands for management is greatest after accepting level I error.

Table 5. User’s and Producer’s Accuracy¹ for Three General Forest Classes.

	Hardwood	Softwood	Mixed	Overall
User’s	91.9% (251/273)	81.5% (53/65)	88.6% (248/280)	89.3% (552/618)
Producer’s	91.9% (251/273)	84.1% (53/63)	87.9% (248/282)	89.3% (552/618)

¹User accuracy compares the total number of polygons interpreted as type ‘x’ with the subset of those polygons observed in the field to be type ‘x’, while producer accuracy compares the total number of polygons observed in the field to be type ‘x’ with the subset of those polygons interpreted as type ‘x’.

Table 6. Initial and Level I-IV Accuracy¹ across 18 Forest Cover Types.

n	Initial	Level I	Level II	Level III	Level IV
618	60±1%	81%	88%	95%	100%

¹User accuracy compares the total number of polygons interpreted as type 'x' with the subset of those polygons observed in the field to be type 'x', while producer accuracy compares the total number of polygons observed in the field to be type 'x' with the subset of those polygons interpreted as type 'x'.

Error levels II-IV were deemed unacceptable for management planning purposes. Fortunately, after accounting for level I error, the overall accuracy for forest cover type increases from the initial level of around 60% to just over 80% (Tables 6 and 7).

In addition to the information obtained on forest cover types, the landcover mapping effort confirmed that both early- and late-seral forest are lacking on WMA lands and their environs. The landcover maps identify sawtimber stage forest stands that can either be moved forward into a late-seral forest condition through passive management, or moved back in succession to early-seral forest through active management.

Forest Cutting Operations & Management Activities

One timber sale was contracted in FY-2002 (Table 8). Sale preparation included marking of trees to be cut, marking of trees to be retained, noting the location of

wetland resource areas, rare species habitat, and priority natural communities, laying out of temporary access roads, and preparation of Chapter 132 Forest Cutting Plans. All sales were prepared in compliance with the Division's Forest Management Guidelines. The guidelines seek to create a distribution of forest successional stages (from early-seral to late-seral forest) in a landscape context that will maintain biological diversity.

Intensity of cutting varies from moderate (group shelterwoods) to high (Aggregate Retention Cuts - ARC's), but groups of mature trees are retained on all sites. Planned harvests are designed to regenerate mixed stands of white pine, red and white oak, and high quality northern hardwoods including black cherry and white ash.

A portion of the monetary value for all sales is realized in the form of "in-kind" services on the WMA's (Table 8). Services include grading, liming, fertilizing and seeding

Table 7. Initial and Level I Producer's Accuracy for 18 Forest Cover Types.

Cover Type	Producer's Accuracy		
	n	Initial	Level I
Central Hardwoods	103	72 ± 3%	92%
Northern Hardwoods	71	71 ± 3%	87%
Mixed Hardwoods	63	63 ± 4%	92%
Hardwood swamp	36	62 ± 4%	61%
C. Hardwood/White pine	65	22 ± 2%	77%
C. Hardwood/Hemlock/White pine	9	65 ± 8%	89%
Pitch pine/C. Hardwood	17	87 ± 4%	88%
N. Hardwood/White pine	25	10 ± 2%	44%
N. Hardwood/Hemlock/White pine	38	63 ± 3%	84%
N. Hardwood/Spruce-Fir	7	100 %	100 %
M. Hardwood/ White pine	71	48 ± 3%	75%
M. Hardwood/Hemlock/White pine	38	46 ± 4%	79%
Mixed wood swamp	12	25 ± 4%	25%
White pine	35	66 ± 3%	77%
Hemlock/White pine	11	71 ± 5%	82%
Spruce-Fir	1	100 %	100 %
Pitch pine/scrub oak	6	83 ± 5%	84%
Softwood swamp	10	67 ± 1%	100 %
Total	618	60 ± 1%	81%

Table 8. Timber Sales Bid in FY 2001

Sale No.	Timber		Fuelwood				Value
	Bid Award	Volume (mbf)	Volume (cords)	Acres Treated	Total Bid	In-Kind	
CV-HC-TS.10	02/18/2002	500	338	65	\$84,000	\$13,875	\$97,875
Total		500	338	65	\$84,000	\$13,875	\$97,875

of landing areas, improvement and subsequent stabilization of existing woods roads using Massachusetts Best Management Practices (BMP's), and felling and slash reduction of non-merchantable trees to encourage regeneration of desired tree species and enhance early-successional wildlife habitat.

All income from a timber sale is generally not received in the same fiscal year the sale is marked. When a sale is awarded through the public bid process, the qualified vendor submitting the highest bid is awarded the contract. Ten percent of the high bid is due at the time the contract is awarded, and the balance (90%) is due prior to the start of cutting. Vendors are given up to two years to begin cutting so that they may take advantage of market conditions.

Biological Monitoring

Breeding bird surveys were conducted on portions of the Hiram Fox WMA in Chester, the Fox Den WMA in Worthington, and the Quabbin Reservoir in New Salem in June, 2002. Forest regeneration plots were established on a portion of the Fox Den WMA in June 2002, and will be sampled at the end of the growing season in September, 2002.

Future Work

Work planned for fiscal year 2003 includes completion of the Forest Stewardship Council's forest certification process, followed by a review of *MassWildlife's* forest management planning efforts to meet any conditions imposed on *MassWildlife* as a result of the certification process. Biological monitoring efforts will be continued, but future forest cutting operations will be delayed until any problems identified in the certification process have been addressed.

Massachusetts Cooperative Fish & Wildlife Research Unit

White-tailed Deer Population Ecology in Massachusetts: Division research programs on deer populations continued in both Carlisle and Windsor study areas. Deer were captured and radio-collared to estimate population density and survival rates. The primary conclusion thus far is that deer are long lived and hunting mortality is low. Graduate Student Chris Gaughan is supervised by Dr. Steve DeStefano. The study will conclude in Spring 2003.

Beaver Ecology in Massachusetts: Dr. Steve DeStefano oversees this study to determine population ecology of beaver along an urban-rural gradient. He has radio-tagged approximately 50 beaver and observed their movements as population density increases and mortality decreases due to a 1996 ballot referendum that restricted trapping. Interestingly, a change in that law in 2000 has resulted in an upswing in harvest by the Problem Animal Control Community and is reflected in radio-tagged beaver mortality data. The objective is to study population ecology (i.e. growth and density), habitat occupancy of wetland areas and survival in suburban and rural Massachusetts.

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NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

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The Aquatic Biodiversity Project

Following the success of *BioMap: Guiding Land Conservation for Biodiversity in Massachusetts*, the Natural Heritage & Endangered Species Program embarked upon an Aquatic Biodiversity Project to create an aquatic complement to *BioMap*. This project sets out to identify, map, and formulate conservation priorities for the state's freshwater plants and animals. The project is underwritten by bond funds made available by the Executive Office of Environmental Affairs.

For more than twenty years, Natural Heritage staff have been compiling biodiversity data on over 50 species of fish, aquatic plants, and aquatic invertebrates like mussels, crayfish and snails. Despite this long history of research, considerably less is known about the state's rare aquatic species than its terrestrial ones. The Aquatic Biodiversity Project aims to bridge this information gap given that freshwater species are just as important as terrestrial plants and animals, and are often even more imperiled. For example, half of the 12 freshwater mussel species in Massachusetts are listed as 'Endangered' or 'of Special Concern'.

In FY 2002, Natural Heritage biologists began to update and improve our understanding of rare freshwater species in Massachusetts. For fish, this process involved meeting with fisheries biologists from around the state to identify fish species of potential conservation concern. For rare aquatic plants, botanists searched herbaria and other data sets for historic plant locations. This research directed a successful field season during which botanists inventoried more than 40 lakes and ponds. Ecologists reviewed and refined the Natural Heritage database of freshwater mussel surveys from the last 10 years and planned surveys for rare snails, amphipods, stoneflies, and crayfish.

In addition to mapping important Core Habitats for rare aquatic species, the Aquatic Biodiversity conservation plan will identify a diversity of high quality aquatic systems from around the state. Natural Heritage staff designed a GIS (geographic information systems) analysis to select different types of seemingly natural lakes, ponds, rivers, and streams. Ecologists are planning to visit these sites to collect biological and habitat data, and to assess the overall ecological integrity of the site.

At the end of FY 2002, Natural Heritage began an exciting collaboration with Kevin McGarigal from the Landscape Ecology Program at the University of Massa-

chusetts in Amherst. The goal of the joint work is to develop a GIS tool that can delineate the watershed upstream of an aquatic habitat and assess its condition. Natural Heritage staff plan to apply this GIS tool to the mapped Core Habitats to identify potential strategies for the protection of freshwater biodiversity.

Production of the Aquatic Biodiversity conservation map, summary report, and GIS datalayers is scheduled for July 2003. Three additional educational products are also in the works: *A Field Guide to the Damselflies and Dragonflies of Massachusetts*, *A Checklist of the Aquatic Macroinvertebrates of Massachusetts and Adjoining States*, and updated *Natural Heritage Fact Sheets* for rare fish and aquatic vascular plants.

2001 Field Season Summary Animals

Birds:

Piping Plover: A coast-wide network of cooperators monitored and managed Piping Plovers (*Charadrius melodus*) in Massachusetts during the 2001 nesting season. Observers reported plovers nesting at 103 sites; 58 additional sites were monitored but no breeding pairs were detected. The Index Count (conducted during a standardized nine-day period) was 481 pairs (vs. 484 in 2000), and the Adjusted Total Count (estimated total number of breeding pairs during the entire season) was 495 pairs (vs. 496 in 2000). Overall productivity for 494 of 495 pairs (99.8%) was 1.49 chicks fledged per pair (vs. 1.09 in 2000). Of 559 nests, 62% hatched ≥ 1 egg, 61% of eggs hatched, and 56% of chicks fledged. The two most common causes of nest loss were predation and abandonment. Mortality of adult plovers was the primary suspected cause of nest abandonment: twenty adult plovers were found dead during the season. Exclosed nests were abandoned more frequently than were unexclosed nests (19% vs. 4%); however, nest success was higher for exclosed nests than for unexclosed nests (75% vs. 41%). The most frequently identified nest predators were crows, followed by skunks, foxes, and gulls.

Terns, Laughing Gulls, Black Skimmers: During the 2001 season, nesting terns were reported from 73 sites out of an aggregate total of approximately 115 sites reported active in at least one year from 1970 through 2000. The increase in numbers of Common Tern resumed in 2001, after a 6% decrease last year. Estimated numbers of Common Terns increased 8% from a year

earlier to 14,378 pairs; another modern record since careful recordkeeping began in 1970. This should be viewed against a 20TH Century backdrop of peak estimates of 30-40,000 pairs in the 1930s, 15-20,000 pairs in the 1950s, and low estimates of 4-5,000 pairs as recently as 1977-78. Least Terns experienced an all time record year, with estimated numbers up 5% to 3,420 pairs, just edging ahead of the 1999 record of 3,416 pairs. Unfortunately, after a brief peak above the 2,000 pair level in FY 2000, estimated Roseate Tern numbers fell back some 20% in 2001 to 1,697 pairs, erasing 3 years of strong gains. The number of Laughing Gulls rose 21% to an estimated 1,322 pairs, approaching a modern record of 1,356 pairs established in 1989. Arctic Terns and Black Skimmers continued at trace levels.

Weather conditions were generally benign in spring/summer 2001, with high tides claiming the usual complement of low-lying nests. Predation, however, seemed to be more widespread in 2001 and canid—especially coyote—harassment and predation reached epidemic proportions. Virtually no site escaped some predation and the impacts were devastating at many locations. Continuing fox predation precluded any chance of recolonization at Plymouth Beach. All productivity was essentially snuffed-out at Gray's Beach, Yarmouth (coyotes, Black-crowned Night-Herons), Nauset-New Island, Eastham/Orleans (coyotes, crows) and at Nauset-Eastham (coyotes). Large Least Tern nesting groups at Dunbar Point (Kalmus), Barnstable and at Sylvia State Beach, Oak Bluffs—among other sites—were plagued by gulls, especially Great Black-backed Gulls, taking chicks. In addition, canids destroyed many nests at Kalmus. Fortunately, the three largest Common Tern colonies—Monomoy-South, Chatham; Bird Island, Marion and Ram Island, Mattapoisett—which in the aggregate accounted for 11,833 pairs (82.3%) of Common Terns and nearly 100% of the Roseate Terns in the state—reported at least fair to good production (both species: 1-1.2 chicks/pair). Yet, even these “flagship” colonies endured attrition by coyotes, gulls, Great Horned Owls and Black-crowned Night-Herons in various combinations.

Common Loon: In the 2001 breeding season, we continued to experience an increase in territorial pairs but for a variety of reasons this increase did not translate into an increased number of nesting pairs. Reproductive potential was limited by lack of suitable natural nesting sites, lack of available nesting rafts, and operational/logistical difficulties in deploying rafts on waterbodies where they would have been beneficial. Overall productivity was reduced by nests flooded by rising water levels in mid-June and possibly by the effects of crowding evidenced by the presence of “rogue” loons and extra pairs. We suspect that predation and boat activity may have adversely affected the productivity of certain pairs.

During the season, we estimated 23 territorial pairs in the state, up from 22 pairs a year earlier and the highest number of territorial pairs we have reported since

nesting loons returned to the state in 1975. Out of the 23 territorial pairs, however, only 11 pairs were actually known to have laid eggs, the same number as last year, despite increased monitoring efforts. Another 11 pairs likely did not lay eggs and the nesting status of one pair was undetermined.

We now have territorial pairs on 9 waterbodies, up from 7 in 2000. This increase is due to the appearance of a territorial pair at Wachusett Lake, where pairs have been found sporadically in the past. The site, which would clearly benefit from a raft, offers no good nesting islands and loons are not known ever to have nested there successfully. The second new site resulted from the splitting of the Haines Reservoir-Leominster/Hycrest Reservoir-Sterling pair, into two pairs after it was determined that *each* site does indeed harbor a discrete territorial pair. Loons at both Wachusett Lake and Haines Reservoir, among other sites, desperately need rafts if they are to become productive.

Seven of the nesting pairs were successful. Of 13 chicks hatched, eight were presumed to have fledged. Estimated productivity was 0.73 chicks/nesting pair, compared to 0.82 and 0.70 reported in 2000 and 1999, respectively.

Hiram Fox WMA Forest-nesting Bird Surveys: Begun as a pilot survey in 1987, data have been collected during early June in every year except 1998 with data collected at 100 forest stations. Information from this survey has revealed little change in overall bird numbers and species composition on the property over the past 14 years. This suggests that bird populations in unfragmented forested landscapes continue to be quite stable. There has been some decline in species diversity, as forest openings created in the early 1990s have reverted to forest, resulting in a loss of some early successional species and a decline in the numbers of others.

In June 2001, 1136 individuals of 53 species were recorded, as compared to 957 individuals of 54 species in 2000. The ten species recorded most frequently on the property in 2001 were: Red-eyed Vireo (217 detections); Ovenbird (183); Black-throated Green Warbler (94); Veery (68); Wood Thrush (47); Black-capped Chickadee (43); American Redstart (38); Yellow-bellied Sapsucker (35); Black-throated Blue Warbler (32); and Black-and-white Warbler (32).

Bald Eagle: A record number of twelve active Bald Eagle nests were located during the 2001 nesting season. These included nests at Quabbin Reservoir (4), the Connecticut River (5), the Farmington River, Sandisfield (1), Pocksha Pond, Middleborough (1), and Quabog Pond, Brookfield (1). The two new nests were at Quaboag Pond and in Longmeadow on the Connecticut River. Neither of these pairs are thought to have laid eggs in their new nests. Six of the ten pairs that are believed to have laid eggs hatched eleven chicks, but one was killed when its nest was blown out of the tree in a storm. Since 1989, when the first nesting in recent

history occurred, a total of 126 young eagles have been fledged in Massachusetts.

During the January 12, 2001 Midwinter Bald Eagle Survey, a total of 61 Bald Eagles (44 adults and 17 immatures) and one adult Golden Eagle were reported. Areas where Bald Eagles were observed included Quabbin Reservoir (23), Connecticut River (18), Merrimack River (7), Silver Lake (4), Westport River (3), Assawompsett Pond (2), Housatonic River (2), Wachusett Reservoir (1), and Taunton River (1). The Golden Eagle was at Quabbin Reservoir. This survey included one more Bald Eagle than was reported in January 2000. The Quabbin Reservoir and Connecticut River were again surveyed with the aid of a helicopter provided by National Grid USA/ Massachusetts Electric Co.

Peregrine Falcon: The four traditional nesting pairs were successful, raising a total of 13 chicks. These nest sites, with the first year they were occupied, include the Customs House in Boston (1987), the Monarch Place Building in Springfield (1989), the Christian Science Church Administration Building in Boston (1996) and the Braga Bridge (I-95) in Fall River (1996). This year a pair was also present in a nest box on top of the library building on the University of Massachusetts campus in Amherst where one broken egg was discovered. Another pair was also present at Farley Cliff in Erving. This represents a real milestone as it is the first territorial pair of Peregrine Falcons on a natural cliff in Massachusetts since 1955 when the last pair that nested on Monument Mountain in Great Barrington disappeared as a result of the pesticide DDT.

Reptiles & Amphibians:

Plymouth Redbelly Turtle: A record 81 nests were discovered in the summer of 2002. These nests contained 1,016 eggs; 213 did not develop, 55 embryos died in the egg and 728 (72%) hatched. Some 230 hatchlings were raised (headstarted) over the winter and released during the following spring.

This marked the first year that the efforts to locate and protect nests, and to retain some of the hatchlings for headstarting, were not led by Dr. Terry Graham of Worcester State College. As Dr. Graham prepared for retirement, the task of locating and protecting nests was taken over by John Crane of Plymouth. Dr. Graham has studied Plymouth Redbelly Turtles since about 1969 and is responsible for protecting hundreds of nests which have produced thousands of hatchlings over the years. Dr. Graham is the primary author of many research papers on this turtle. His efforts have contributed significantly to the continued survival of this population and are greatly appreciated.

Invertebrates:

Northeast Beach Tiger Beetle: Federally Threatened, State Endangered. Sites on Martha's Vineyard and in Bristol County were monitored in 2001 and a translocation of larvae to Monomoy Island was conducted. Due to



Mating Puritan Tiger Beetles do their part to increase the population at Rainbow Beach.

the death of the primary researcher, Dr. Philip Nothnagle, more complete data are not yet available.

Puritan Tiger Beetle: Federally Threatened, State Endangered. The Silvio Conte National Wildlife Refuge continued to support the third mark re-sight study of adult puritan tiger beetles. A trained biologist and volunteers visited the sites throughout the flight season and individually marked each adult beetle captured and recorded observations on previously marked beetles. To the extent possible, larvae were monitored in the spring and fall. The population was augmented with 34 larvae translocated from Connecticut. A total of 41 adults were marked at Rainbow Beach. Due to the two year life cycle it is expected that augmentation efforts will yield an increase in adults in the summer of 2002, provided there is good survival through the winter months. In addition, a student (formerly a volunteer on this project) at Antioch College conducted a pilot study designed to determine the impact of recreational activities on adult beetle behavior.

Odonates: One of the highlights of the 2001 field season was the outcome of the joint contract with The Nature Conservancy and NHESP to hire Leah Gibbons and Jim MacDougall to survey 22 sites for the Banded Bog Haunter (*Williamsonia lintneri*), which is listed as Endangered in MA. It is a rare inhabitant of bogs and is known only from Rhode Island north to southern Maine with a few disjunct populations in the Great Lakes region. Gibbons and MacDougall found three new sites, all with evidence of breeding. We now have 30 known sites in MA of this rare bog species.

Lepidoptera: The primary goals of the 2001 field investigations were:

- (1) To obtain a better understanding of the distribution, rarity, and habitat requirements of state-listed species of Lepidoptera (moths and butterflies) in Massachusetts.
- (2) To gain a greater knowledge of the habitat and its quality within particular BioMap polygons.
- (3) To find new element occurrences (EOs) and update existing EOs.

- (4) To take photographs of rare species of Lepidoptera and their habitats for use in future NHESP publications and presentations.
- (5) To build a small reference collection of rare Massachusetts Lepidoptera.

Field investigations by Mike Nelson were conducted between April 14 and October 14, 2001. Approximately 100 different field sites were visited, spread across most of the state, including 47 towns in 10 of the 11 mainland counties. Essex County, Martha's Vineyard, and Nantucket were not visited. The 100 field sites were distributed among 29 different BioMap core habitats. Many of the larger BioMap cores were visited at multiple sites on multiple dates, and some field sites were not in BioMap core habitat.

During the course of the field season, 515 species of Lepidoptera were recorded in Massachusetts (444 species of moths and 71 species of butterflies). Of these 515 species, 24 are listed as Endangered (E), Threatened (T), or of Special Concern (SC) in Massachusetts; 45 species on the Watch List (WL) were also recorded. Thus 51% of listed species and 29% of watch-listed species were found in the course of the 2001 field season. Many of the 24 listed species were encountered at multiple sites, so that a total of 38 new Lepidoptera EOs were discovered and 18 previous EOs were updated.

Plants

Sandplain Gerardia (*Agalinis acuta*): Federally and State listed as Endangered. The general trend was upward for this species despite declines at a few sites. The success is attributed to continued increases in numbers at managed introduction sites on DEM and *MassWildlife* properties on Cape Cod. The DEM population established in 1994 had an estimated 70,000-88,000 plants and the DFW site established in 1997 yielded a count of 3619. The former was managed with spring mowing and the latter site was pretreated with a spring burn. Also, a naturally occurring population on Martha's Vineyard continued an upward trend, showing its highest count of 3823 plants, three times the count of the previous year. Also, a new population derived from seeds of these plants continued to reproduce at a protected site on the island under the care of a volunteer. This colony increased to 173 in 2001. The decreases were observed at two Cape Cod sites. At one of these sites the decline was modest changing from an all time high 4757 to 3498. At the other a more significant decline (from 1865 in 2000 to 592) occurred due to a mid-October mowing that occurred the previous fall before the new seeds were ripe. A letter was sent to the land manager at this site specifying that no mowing should be done in the last half of each year. Another significant event for this species in 2001 was the completion of a study of the reproductive ecology of *Agalinis acuta* by Dr. Maile Neel, who conducted her research at the DEM managed site.

Small Whorled Pogonia (*Isotria medeoloides*): Federally listed as Threatened. State listed as Endangered.

In its eighth year of continuous monitoring, the State's largest population which is located in Worcester County showed a slight decline (from 111 in 2000 to 93 plants). About 10% of the individuals produced fruits. This was the second year in a row with a slight decline for this population following six years of upward trend. A second population, occurring in Essex County, which once had over 100 individuals but suffered a decline due, we suspect, to heavy deer browsing, showed a slight improvement: 9 plants in 2000 to 16 in 2001. A few other small populations which annually have been showing 0-3 individuals in recent years were not checked.

Northeastern Bulrush (*Scirpus ancistrochaetus*): Federally and State listed as Endangered. No plants were seen at the State's only site for this species, a small pond in Franklin County. The last observation was of four individuals in 1996.

New England Plant Conservation Program: State listed as Endangered. A species conservation plan for the Eastern Silvery Aster (*Aster concolor*), was completed by subcontractor Pamela Polloni. Final drafts of conservation plans were completed by subcontractor Ted Elliman for two other State Endangered species, New England Boneset (*Eupatorium leucolepis* var. *novae-angliae*) and Narrow-leaved Vervain (*Verbena simplex*). The Plant Conservation Volunteer (PCV) program administered by The New England Wild Flower Society fielded 128 volunteers in Massachusetts this year. They completed 185 rare plant monitoring actions of 248 assigned for a 75% completion rate. Of the actions completed, they relocated 82 rare plant occurrences but were unable to relocate 103 others. Additionally, they reported on 32 unassigned monitoring actions. A number of new discoveries of rare plants were made by PCVs and Massachusetts Task Force members, including new occurrences for Long's Bulrush (*Scirpus longii*), River Bulrush (*Scirpus fluvialis*), Britton's Violet (*Viola brittoniana*), Long-leaved Bluet (*Houstonia longifolia*), Papillose Nut-sedge (*Scleria pauciflora*) and Lion's Foot (*Prenanthes serpentina*). The PCVs also invested 37 management action days on Massachusetts rare plant occurrences. Most of these projects involved removing invasive species that were competing directly with rare plant populations. Support for this program continues to be a very good investment of NHESP time.

Aquatic Biodiversity Project: As part of this project, staff Botanist Melissa Dow Cullina conducted many aquatic rare plant surveys during the field season. She confirmed as extant 26 known rare (State List or NHESP Watch List) plant occurrences, relocated an historic occurrence of Threadfoot (*Podostemum ceratophyllum*), and found nine new records for aquatic rare plants, including a new site for Vasey's Pondweed (*Potamogeton vaseyi*), a state Endangered species. She also searched unsuccessfully for 23 previously known rare aquatic plant occurrences. A few of the latter occurrences represented old historic records, but most represented past observations from 1974 onward. Failures in some

instances appear to be due to invasive species and other threats to the aquatic ecosystems. Records of plants which appear on the Watch List were digitized so that these records could also be accessed through the Geographic Information System. Confirmed aquatic records will be used to map "core habitat" areas for the project's conservation map.

Invasive Plant Species: Dr. Les Mehrhoff of the University of Connecticut was employed under contract to evaluate 40 non-native species for the Plant Evaluation Subcommittee of the Massachusetts Invasive Plant Working Group. Some progress, albeit slow, was made in evaluating species against criteria approved by the Working Group in 2000.

Bryophyte Surveys and Atlas: A small research contract with Susan Williams of Rowe, Massachusetts produced the first county atlas of the mosses, liverwort and hornwort species of Massachusetts. Her surveys of selected sites in western Massachusetts produced 11 new state records and 46 new county records.

Boston Harbor Islands Flora Survey: As part of a biological survey of the Boston Harbor Islands being performed for the National Park Service, Ted Elliman, working with guidance and logistical assistance from NHESP staff, completed most of a vascular plant inventory of the islands. Also, the first half of a two-year bryophyte and lichen survey for the islands was completed by Dr. Scott LaGreca and a team of associates from Harvard University's Farlow Herbarium.

Other Botanical Highlights: Melissa Dow Cullina had some terrestrial botanical finds during the field season, turning in new records for the State Listed Swamp Oats (*Sphenopholis pensylvanica*) and Smooth Rock-cress (*Arabis laevigata*) as well as for four Watch List species. Highlights for State Botanist Paul Somers were helping to relocate a population of the state Endangered Swamp Lousewort (*Pedicularis lanceolata*) and then helping to ensure that the site was acquired by *MassWildlife*. Another success for Somers was relocating healthy populations of Fragile Rock-brake (*Cryptogramma stelleri*) and Goldenseal (*Hydrastis canadensis*) at a privately owned site in Berkshire County where home construction activities were feared to have negatively impacted these State Endangered species.

Community Ecology

Natural community data were collected in northern hardwood forests and Spruce-Northern Hardwoods stands mostly on the Berkshire Plateau in large contiguous areas that came up in BioMap as Supporting Natural Landscape, and stands with a significant component of tulip trees, mostly in the Connecticut Valley. A total of 109 coastal plain ponds were visited and evaluated. Rich Mesic forests and hickory hornbeam at Mt. Wachusett and the Minns Wildlife Sanctuary were also visited.

Ecological Restoration

The Ecological Restoration Program employed one full time restoration ecologist (Tim Simmons) and two part time assistant restoration ecologists (Chris Buelow and Joanne Singfield). In addition to the projects they worked on individually, they also work with contractors and the University of Massachusetts to accomplish annual restoration goals.

During the field season 2001, Chris Buelow, assistant restoration ecologist, patrolled the Hyannis Ponds Wildlife Management Area where off road vehicle (ORV) damage had escalated dramatically in recent years. He stopped ORV riders, explained the reasons ORV traffic is harmful to the biological resources for which the WMA was purchased and reminded the riders that ORV use in WMAs is illegal. Chris's efforts have drastically reduced ORV use of the area and pond shores are recovering. In addition, Chris began a survey of the breeding birds of the Hyannis Ponds WMA and monitored grassland birds at the Francis Crane Wildlife Management Area in Falmouth. The most notable observation was the successful breeding of a pair of upland sandpipers, the first nest there in several years. Restoration of 95 acres of open grassland through *MassWildlife's* Habitat Management Program is the reason the birds have returned.

A contract with The Nature Conservancy (TNC) continued the control of invasive exotic plant species at sites owned by TNC and *MassWildlife* in Stockbridge and Egremont. TNC also conducted research on the effects of water level fluctuations resulting from beaver activity on the habitats of listed species.

The New England Wildflower Society was hired to continue the restoration of native grassland habitat at Noquochoke WMA in Dartmouth and to continue to control Phragmites at Crane Pond WMA in Groveland. At Noquochoke they collected seed from nearby sources, prepared plots that had been dominated by non-native species, sowed seed and tended the plants until they were self sustaining.

Contracted biological surveys were completed at Palmer WMA and an inventory of rare plants and plants that support rare insects was conducted on the power lines at Montague Plain WMA. The inventory will provide the basis for cooperative management of the powerlines with Northeast Utilities as stipulated when the WMA was acquired.

A fire and fuels management plan was begun for the Camp Cachalot conservation restriction in Plymouth. This plan will focus on the use of mechanical methods and prescribed fire to increase the safety of the camp for boy scout operations while maintaining and restoring habitat for rare and common species.

Within an Interagency Service Agreement with the University of Massachusetts, Amherst, staff and graduate students were placed under contract to begin a fuels and fire management plan for Montague Plain WMA and

to burn research plots at Montague Plain WMA and Francis Crane WMA. In addition, a study was begun on the effects of an invasion of *Phragmites australis* on interdunal swales at Sandy Neck in Barnstable. The study will examine the response by native plants to control efforts.

Upland Habitat Management Program

The Upland Habitat Management Program (Upland Program) of *MassWildlife* is a component of The Biodiversity Initiative established under the 1996 Open Space Bond Act to maintain and restore native diversity of flora and fauna through active land management. The Upland Program focuses on reclaiming abandoned field and other early-successional habitats, which have been declining steadily for the past 75 years. Specific goals of the Upland Program are to:

- 1) Foster and apply the best available science to identify appropriate sites for management of declining upland habitats, (including early-successional, post-agricultural herb/shrub plant communities, aspen forest stands, and abandoned orchard sites) while maintaining extensive, unfragmented forest lands.
- 2) Implement strategies and techniques to manage and restore declining upland habitats to ensure they continue to support native flora and fauna.
- 3) Scientifically monitor the effects of upland habitat management on plant and animal communities to ensure that managed ecosystems continue to support the native biodiversity of Massachusetts.



A whole tree harvester reclaims abandoned field habitat.

- 4) Identify ecosystems and natural areas where Upland Program objectives are complementary with Ecological Restoration Program objectives and pursue joint endeavors with that program.

Abandoned Field Reclamation Projects

Leyden WMA: This project constituted initial reclamation of a 55-acre abandoned pasture using a whole-tree chipping operation coupled with a Brontosaurus mower. The pasture hadn't been actively used for at least 10 years and was growing in with multiflora rose, barberry, autumn olive, white pine, and numerous other trees and shrubs. In July, 2001, the invasive exotic plants were treated with an herbicide in preparation for the clearing portion of the reclamation project.

Westboro WMA: Seventeen and a half acres, constituting the safety zone around the Field Headquarters Building and neighboring businesses, were mowed just prior to the start of the pheasant hunting season. For safety reasons, this area will continue to be mowed annually.

Notchview Reservation: In 1999, *MassWildlife's* Upland Program entered into an agreement with the Trustees' of Reservation's (TTOR) to assist with the reclamation of 11 acres within an existing 40-acre abandoned hayfield. The hayfield had been maintained via annual mowing since acquisition in 1968. However, a treeline consisting of quaking aspen, gray birch, red maple, white ash and others, had matured and was bisecting the field creating two small patches of grassland habitat. This treeline and another portion of the field, which consisted of pole and small-timber sized trees were cleared with tree shears and Brontosaurus mowers in September 2000. The cleared treeline was then stumped and planted to cool-season grasses in October 2001 to create one larger patch of grassland habitat.

Crowes Pasture Conservation Area, Dennis, MA: Fifteen acres of abandoned pasture were cleared of invading trees and shrubs at the Crowe's Pasture Conservation Area in Dennis, MA in February, 2000 to reclaim coastal grassland habitat. The area was then revisited late in the growing season of 2001 to herbicide treat woody resprouts and invasive exotic plants. In February 2002, this same area was mowed with a four-wheel drive tractor and brush hog to remove the dead stems resulting from the herbicide treatment, and to further the reclamation process.

Invasive Plant Control Projects

Notchview Reservation: In July 2001, prior to the stumping and planting project described previously, the invasive exotic plants (mostly common buckthorn) within and surrounding the project site were herbicide treated (a total of 40 acres). Buckthorn was a dominant component of the old hayfield, making the area unsuitable for many species of early-successional wildlife.

Haley Farm, Mount Greylock: This project constituted herbicide treating the invasive exotic plants (mostly barberry and multiflora rose) within a 46-acre abandoned pasture. After the herbicide treatment, this area is planned for selective clearing in fiscal year 2003 to maintain it in an herb-shrub community.

Crowes Pasture Conservation Area, Dennis, MA: Prior to the maintenance mowing described earlier, the invasive exotic plants (mostly honeysuckle and multiflora rose) within the reclamation area were herbicide treated to aid in the reclamation of coastal grassland habitat.

Crane Wildlife Management Area: The invasive exotic plants on 21.5 acres were treated with herbicide to aid in the reclamation of grassland habitat.

Biological Monitoring

A long-term monitoring program of birds, butterflies, and vegetation continued on selected Upland Program sites across the state. A total of 253 acres were surveyed at five different sites in fiscal year 2002. This data is being entered into a database for analysis this winter.

Survey data will assist in refining vegetation composition and structure goals for each area. Vegetation composition and structure data will also be related to results from the bird surveys to determine habitat attribute requirements of various suites (i.e., communities) of early-successional birds. This information will aid in developing/adapting vegetation structure and composition goals for various bird species and communities desired on managed sites. Survey data will also assist in determining the success of herbicide treatments to control invasive exotic plants, and if follow-up applications are needed to obtain complete control.

Forest Stewardship Program

The DEM administered Forest Stewardship Program was funded once again during fiscal year 2002 to assist with abandoned field reclamation projects, invasive exotic plant control projects, biannual maintenance mowing of fields, and orchard release projects on private lands. The Upland Program provided \$26,970.00 to fund two abandoned field reclamation projects covering 23 acres and two invasive exotic plant control projects covering 26 acres.

Coverts Program

The Coverts Program was funded once again this fiscal year. For a cost of \$14,000, Dr. David Kittredge, the Cooperative Extension forester, held a three-day forestry and wildlife habitat conservation workshop for 17 community leaders responsible for the stewardship and management of 1,094 acres of forestland in the north Quabbin region. All of these individuals serve on their community Conservation Commission, a local land trust, or within one of their town's conservation offices. Workshop topics included Massachusetts's land use history, the Forest Cutting Practices Act, elements of wildlife habitat, habitat management techniques, and rare species, communities, and habitats, among others.

Small Research Contracts Program

The following projects were undertaken in FY 2002 under the Program's Small Research Contract Program:

Aquatic Biodiversity Project:

- | | |
|-------------------|--|
| Robert Bertin: | Examine selected bodies of water in Worcester County for aquatic macrophytes. |
| Mario Degregorio: | Survey for <i>Utricularia resupinata</i> and other rare Utrics in Barnstable County. |
| Alex Haro, PhD: | Survey Deerfield and Westfield River Watersheds for rare native fish. |
| Mark Mello: | Macroinvertebrate inventory of southeastern MA small rivers. |
| David McLain: | Survey of four state-listed snails in Lake Onota, Lake Mahkeenak, Schenob Brook, and Mill River. |
| Ethan Nedeau: | Survey of <i>Diurna nanseni</i> and <i>Hansonoperla appalachia</i> in streams throughout central and western MA. |
| Don Pugh: | Survey for Dwarf Wedgemussel on the Fort River in Amherst and Hadley. |
| Russell Winchell: | Search for new records on Cape Cod of rare freshwater mussels. Also update database for presence of Walker's limpet. |

Non-Aquatic Projects:

- | | |
|----------------------|--|
| Donald Padgett, PhD: | Study <i>Cardamine longii</i> (Long's Bittercress) in MA. |
| Jamie Bogart: | Protect, monitor and manage Piping Plover nests in Bristol County. |
| Betsy Colburn: | Inventory Sphagnum-dominated habitats of the northern caddisfly, <i>Phanocelia canadensis</i> . |
| John Crane: | Conduct one month's search for Plymouth Redbellied Turtle nests; cage nests when found. |
| Terry Graham: | Use of radiotelemetry to compare the daily movements of 6 headstarted and 6 wild juvenile Plymouth Redbellied Turtles. |
| Scott Hecker: | Monitor Piping Plovers, American Oystercatchers, and tern at selected beaches on Cape Cod. |
| Fred SaintOurs: | Conduct surveys for rare Odonata on the Winnetuxet and Weweantic Rivers. |

David Small: Survey appropriate habitats for *Williamsonia fletcheri* and *Gomphus borealis* in the Millers River Watershed.

Susan Williams: Continue to develop a baseline of information about the abundance and distribution of mosses and liverworts in MA.

Environmental Review

A total of 1580 environmental reviews divided into six review categories were processed as follows:

<u>Review Type</u>	<u>Count</u>
Conservation Plan	17
Forest Cutting Plan	76
MA Endangered Species Act	702
Notices of Intent	828
Water Management Act	16
Public Documents Requests	23

Vernal pool certification: 528 new vernal pool certifications were processed in the 2002 fiscal year.

Vernal Pools for Educators Workshop Series

The NHESP held a series of seven workshops in collaboration with the Vernal Pool Association at Reading Memorial High School in the spring of 2002. The Vernal Pools for Educators workshops are full-day workshops for teachers who wish to get involved in vernal pool studies as a science, interdisciplinary, or community outreach activity. Workshops were aimed primarily at the middle and high school educator, teaching biological, life science, or environmental topics. The workshops provided classroom instruction on vernal pool natural history and ecology, and developed interdisciplinary concepts by bringing in writing, art and graphic presentation, and civics. Attendees were provided with an array of educational materials and resources that facilitate the incorporation of vernal pool topics into classroom activities and lessons. Workshops were conducted in Ipswich, Dighton, Norwell, Wilbraham, Athol, Bedford and Hudson.

Data Management and Data Products

In FY2002, a total of 881 new records were entered into the Natural Heritage and Endangered Species Database. These included records for 597 certified vernal pools, 83 rare animal sites, 83 rare plant sites, and 118 natural communities. A total of 116 previously documented records were updated. During this period, we completed a shift begun in the previous fiscal year to mapping all rare species, vernal pool and natural community locations in a digital, GIS-based environment. Previously, all mapping was done on paper topographic maps.

Land Protection

In the fiscal year 2002, *MassWildlife* spent about \$16 million to protect approximately 8,000 acres of land across the state, bringing the agency's total land holdings to more than 132,000 acres. Noted below are a few of the recent acquisitions with particular importance to Natural Heritage concerns.

2002 proved to be an exciting year for land acquisition in northeastern Massachusetts, where *MassWildlife*, with the help of the Department of Environmental Management, acquired an important parcel - the summit of Mt Watatic, eastern Massachusetts' second-tallest mountain. The acquisition of the 280-acre property ties together the Watatic Mountain Sanctuary with the Ashby Wildlife Management Area and the Ashburnham State Forest, and prevented the construction of a cell phone tower on the summit. Recent invertebrate survey work has identified the summit of Mt. Watatic as important habitat for the adults of many rare species of dragonflies, including two Special Concern, one Threatened, and one Endangered species.

In southeastern Massachusetts, one of the largest acquisitions by *MassWildlife* in recent years was the purchase of 1638 acres on the Hanson and Halifax border from the Northland Cranberry company. This new Burrage Pond Wildlife Management Area is mainly wetlands, including Atlantic White Cedar Swamps, Red Maple Swamps, the open water of Burrage Pond itself, and several very large former cranberry bogs. The area has been known for decades as an exciting bird-watching area and provides nesting and migration habitat for many species of waterfowl.

Another important acquisition in central Massachusetts was the 141-acre Culley property that abuts the Bolton Flats Wildlife Management Area. About half of the property is floodplain forest along the Nashua River, and the remainder is reclaimed sand pits where Pitch Pine and Scrub Oak once grew. A few small pockets of this Pitch Pine- Scrub Oak Community remain on the property and are associated with the only known population in the state of a regionally rare moth (proposed as Threatened). The Culley parcel is also habitat for two species of rare turtles and several more species of rare moths.

In the Connecticut River valley, acquisition of 130 acres along Broad Brook in Southampton will protect an excellent population of a state-listed Endangered plant, as well as two species of rare turtles. This property is the lowland end of a swath of mostly protected land stretching from Mt. Tom in Holyoke southwestward through Easthampton to this new DFW property. Elsewhere, in Goshen the purchase of 46 acres and the gift of a conservation restriction on 33 acres adjacent to a very good Level Bog at Lilly Pond will help protect the water quality in the bog from the impacts of development.

In Berkshire County the purchase of about 332 acres on Day Mountain in Dalton will protect a Rich Mesic Forest,

as well as populations of two Special Concern plants. In Sheffield further protection of the Calcareous Talus Forest and four state-listed plants found on cliffs of the Dolomite Ledges Natural Heritage Area will be ensured by the acquisition of 48 acres adjacent to the current DFW holdings.

Natural Heritage & Endangered Species Advisory Committee

Members: Kathleen Anderson (Chair), Marilyn Flor, Joseph S. Larson, Mark Mello, Stephen M. Meyer, Jonathan A. Shaw and Pamela Weatherbee.

Associate members: Brian Cassie, Scott Jackson, Glen Motzkin, Blair Nikula, Wayne Petersen, Mark Pokras and Tom Rawinski.

During FY02 the Committee held 11 scheduled meetings. August has been a traditional vacation month for the Committee. Ten of these meetings were held at the Westborough Field Headquarters and the November 2001 meeting was held in the Moakley Building at Bridgewater State College, Bridgewater, MA. Business of the Natural Heritage & Endangered Species Advisory Committee included:

- Discussions of the proposed changes to the list of endangered, threatened, and special concern species
- Continued discussions of wildlife habitat protection guidelines for Wetland Resource Areas under the Massachusetts Wetland Protection Act
- Review of the 2001 Small Research Contract project results
- Review of the 2002 Small Research Contract proposals
- Review of the Program's proposed annual budget
- Discussion of the Teaming with Wildlife/CARA effort
- Initiation of a review of the delisting process for state-listed rare species

Special presentations that were given to the Committee included:

- A description of the functions and structure of DFW, given by Director Wayne MacCallum,
- A presentation of the biological status of the beaver and the current laws in Massachusetts that relate to its management, given by DFW's furbearer biologist Chrissie Henner,
- A presentation of the Massachusetts Audubon Society's (MAS) ecological research and management programs, given by MAS senior scientist Taber Allison.
- A presentation of DFW's Target Fish Community project, given by DFW fisheries biologist Todd Richards.

Nature Preserves Council

The Nature Preserves Council members are:

Chair, Lisa Vernegaard, Director of Planning and Ecology, the Trustees of Reservations;

Secretary, Tom Rawinski, Director of Ecological Management, Massachusetts Audubon Society; Mark Mello, Research Director, The Lloyd Center for Environmental Studies;

Pamela Weatherbee, Botanist

Agency Associate members were Jack Lash, DEM and Peter Church, MDC.

The Council began review of potential sites on DFW properties that were highlighted in the BioMap project. Lists of the WMAs by town and BioMap core areas were provided as the basis of the initial review. Natural community types within the WMAs will be the focus of further analysis and discussion, with the aim of a building a state-wide system of good examples of as many natural community types as possible.

Natural Heritage & Endangered Species Program Staff

Thomas French, Ph.D., *Assistant Director*
Henry Woolsey, *Program Coordinator*
Bradford Blodget, *State Ornithologist*
Tara Boswell, *GIS Assistant*
Chris Buelow, *Restoration Assistant*
Matt Burne, *Vernal Pool Ecologist*
Amy Burnham, *Finance & Projects Administrator*
Claire Corcoran, *Ecologist*
Melissa Dow Cullina, *Botanist*
Hanni Dinkeloo, Esq., *Endangered Species Counsel*
Nancy Eddy, *Administrative Assistant*
Marea Gabriel, *Habitat Protection Specialist*
Fran Garretson, *Aquatic Ecologist*
Sergio Harding, *Data Manager*
Lynn Harper, *Regional Habitat Protection Specialist*
Patricia Huckery, *Wetlands Environmental Reviewer*
Asuka Imai, *GIS Assistant*
Jennifer Loose, *Invertebrate Zoologist*
Erica McGrath, *Environmental Review Assistant*
Scott Melvin, Ph.D., *Rare Species Zoologist*
Carolyn Mostello, *Tern Restoration Project Leader*
Michael Nelson, *Invertebrate Zoologist*
Jessica Patalano, *Projects Assistant*
Nancy Putnam, *Ecologist*
Tim Simmons, *Restoration Ecologist*
Joanne Singfield, *Ecologist*
Paul Somers, Ph.D., *State Botanist*
Chloe Stuart, *Aquatic Biodiversity Project Manager*
Patricia Swain, *Plant Community Ecologist*
David Szczebak, *GIS Manager*
Christine Vaccaro, *Environmental Review Assistant*
Additional information provided by:
Jim Oehler, *Upland Habitat Project Leader*

INFORMATION & EDUCATION

Ellie Horwitz
Chief, Information and Education

The Information and Education Section has the responsibility and challenge of keeping sportsmen and the general public apprised of regulations, laws and recreational opportunities related to wildlife. It provides news about wildlife and maintains a flow of information about wildlife related issues. In order to enhance public understanding of wildlife management and compliance with laws and regulations, the Section maintains an active program of educational outreach to develop a public which is aware of, and in tune with, wildlife matters. During the year we continued many different information and education programs, and revised administrative processes and products.

NEW FOR 2002

Wildlife viewing area signs, sporting a binocular logo, were emplaced on roadways around the Commonwealth.

Planning efforts began for a Visitor's Center at the McLaughlin Trout Hatchery in Belchertown.

A new system was established for sending out requests for printing bids. Specifications for minor print jobs (e.g. signs, permits, check station cards, etc.) are now contained in an electronic database. Requests for bids are issued electronically. This is faster than the traditional mail system, provides vendors with a better opportunity to obtain clarification of specifications and reduces the amount of paper involved in the bid process.

An electronic notification system was inaugurated for the Becoming an Outdoors-Woman program to increase outreach and reduce costs.

Information and Outreach

Media Services

The Media Coordinator prepared 16 news release packets. These were distributed to 100 fax recipients, 330 e-mail recipients and 1600 hard copy recipients representing major TV and print media outlets, town clerks, conservation commissions, conservation and sporting organizations, other state agencies, outdoor writers and agency staff.

He prepared and issued eight Media Advisories notifying recipients of events or time sensitive news items including presentation of the Sargent Award, EOE Trout Stocking events, information on Chronic Wasting Disease, acquisition of lands at the Salisbury WMA and more. He also fielded 1,788 telephone calls, 633 of which were direct inquiries from television, newspaper, radio or outdoor writers. Through these efforts he

assisted writers in their production of articles that generated 2,463 newsclips.

Website

The agency website serves an important role in information services. Use of the site continues to expand. In July 2001 there were 54,900+ hits on the site; in July 2002 there were 97,700+.

During the spring of 2002, the Commonwealth launched a redesigned webpage. Staff coordinated their efforts with those of the state Information Technology Department to ensure that the state's Outdoor Recreation area now includes links to *MassWildlife* webpages. Following the state's webpage redesign, agencies were asked to promote their websites using a "mass.gov" prefix. This agency's web address is now www.mass.gov/MassWildlife although we continue to support, www.MassWildlife.org

Keeping the website up-to-date with pertinent information — notes on trout stocking, news about regulations, listings of workshops, events and other activities—continues to be key. Additions to the agency website included "turkey pages" that include a downloadable brood survey form and "cottontail rabbit pages" accompanied by rabbit sighting survey information. Also posted were BioMaps, information about the ban on the importation of live cervids, a brief description of the agency mission, biographies of Fish & Wildlife Board members, and the *Pocket Guide to Animal Tracks*.

Response to Public Inquiry

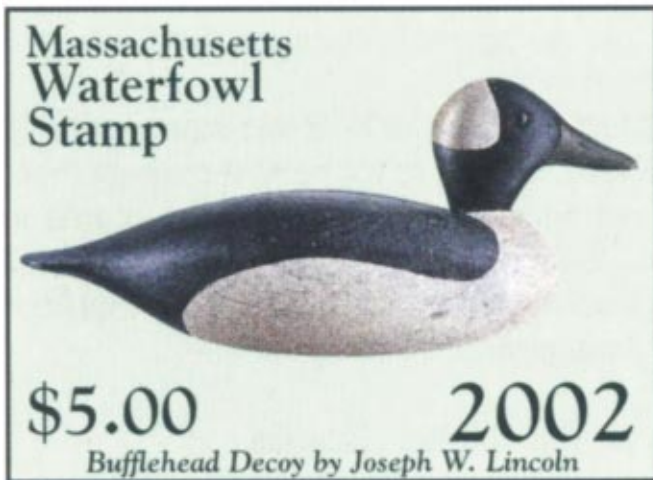
The volume of communications coming to *MassWildlife* continues at a high level with inquiries arriving by telephone, mail, e-mail, and by way of the website. Telephone inquiries appear to be steady; mail and direct e-mail inquiries are down and inquiries through the website are increasing. As in the past, Section staff fielded inquiries on a wide variety of wildlife issues and species, and participated in informational meetings.

Production of Annual Materials

Licenses and Abstracts

The "new" license form, now in its second year, has been well received and comments are heavily positive. Using the production timeline developed in FY 2001, materials for 2002 were generated, reviewed and received in a timely manner. As this is working well, no changes are anticipated. In addition to the annual

abstracts of Fish and Wildlife laws, abstracts were prepared of the regulations pertaining to the hunting of migratory birds and regulations pertaining to the trapping of furbearers.



A panel of five judges selected Peter Baedita's painting of a Bufflehead by Joseph Lincoln.

Waterfowl Stamps

2002 is the 29th year of the Massachusetts Waterfowl Stamp! Artwork for the 2002 stamp was selected in a morning competition held at the Peabody/Essex Museum in Salem on September 11, 2001. In that competition a panel of five judges selected Peter Baedita's painting of a Bufflehead by Jos. Lincoln.

The competition and subsequent celebration were cut short by the events of that morning.

Subsequently a reception was held at the museum to honor Peter Baedita and to celebrate the successes of the waterfowl stamp program.

Archery and Primitive Firearms Stamps

Artwork for the 2002 Archery and Primitive Firearms stamps was a doe and a buck in a field designed by Barry Julius of Brockton, MA.

Publications

The Division's most visible publication is *MASSACHUSETTS WILDLIFE*, a 40 page, full color quarterly which is sent to more than 22,500 paying subscribers, a rate which appears to be steady. The four issues produced this year, (Fall 2001 - Summer 2002), covered a wide variety of subjects, including management, education, habitat enhancement, rare and endangered species, history, general nature interest and "how to" articles for the hunter, fisherman and nature observer. The first issue of 2002 is of particular interest, as it was a special issue devoted entirely to the BioMap and the difficulties managers encounter when trying to devise management programs for reptiles, amphibians and insects. Articles of particular note this year included one on the natural history and identification of our tiger beetles, another on the history of deer management in the Commonwealth, another on the history of the wood

duck nest box program, another on the Non-game Advisory Board, and one on using remote cameras to capture secretive wildlife on film for fun and research. There were also feature articles on the flying squirrel, collecting wildlife cards, monarch butterfly migration, American chestnut restoration, the common loon, the Forest Legacy Program, and selecting the right shotgun for deer hunting.

During this year we devised a promotional plan for the magazine using existing mailing lists. Subscribership could increase further if there were a promotional budget. Section staff continued to work with the Registry of Motor Vehicles to explore ways to continue promotional mailings through the RMV. Their mailings have been privatized. We are now working with Imagitas, the company which has taken over Registry mailings to see whether there is a possibility of continuing the partnership.

Other Publications

Few additional publications were produced this year due to limited funding, but we did manage to produce a new and updated edition of the *Outdoor Recreation Map of Massachusetts*, working in conjunction with DEM and the Public Access Board. Other publications updated and printed included trout & pheasant stocking lists, BOW event materials, a list of towns with hunting restrictions, *A Homeowner's Guide to Bats*, etc. Production staff worked closely with furbearer project leader Susan Langlois and the Northeast Furbearer Resources Technical Committee to produce a publication entitled *Trapping and Furbearer Management in North American Wildlife Conservation*, a publication of TWS and the U.S. Fish & Wildlife Service that was distributed to all 50 states and Canadian Provinces. The Section also produced a color flyer for the Upland Habitat Program, and the "Ten Commandments of Hunter Safety" plastic wallet card for the Hunter Education Program.

The Publications Review committee met and established a list of its priorities. Based on these priorities we updated and printed the *Homeowner's Guide to Bats*, the coyote poster, WILD certificates and labels, *Massachusetts' Bird List* as well as a revised version of *Critters of Massachusetts*.

Photography

The staff photographer continues to provide an extensive display of supporting photography for each of the four issues of *MASSACHUSETTS WILDLIFE* magazine. This year those efforts entailed additional photography for a portfolio developed in FY 2001 on the Connecticut River tiger beetle. Other special assignments included photography of the American chestnut restoration project, biodiversity specials, and documentation of nocturnal flying squirrels.

In addition to special assignments and shooting for the magazine, the photographer has the equally important quarterly task of making certain that there are sufficient high quality images for the Editor's selection process and assisting with final image selection for each issue.



Notable events documented photographically were: fitting a satellite radio transmitter collar to a nesting Canada goose, trout stocking in the Assabet River, Becoming an Outdoors-Woman activities in Lenox, and bald eagle and peregrine chick banding efforts.

Photographer Bill Byrne provided three Natural History Photography presentations to Bay State groups, including the Dunstable Bird Club, Great Meadows National Wildlife Refuge, and the Nissitissit Chapter of Trout Unlimited.

Bill shot and edited B-roll video footage of eastern wild turkeys for use by "Wild Moments" national network television program, with a focus on the success of the Massachusetts Turkey Restoration Project.

In addition to the programs noted above, the photographer and the Section Chief met with a photo librarian to explore concepts for a *MassWildlife* electronic photo library and explored software options which could be used effectively to establish such a library.

Education Programs

Section staff members presented lectures, slide shows and "hands-on" programs on wildlife and wildlife management to many elementary, middle and high school groups, reaching over 3,000 students. They also provided programs for civic groups, sportsmen's clubs, senior centers, museums and audiences at special events. They participated in "career" days, judged science fairs and provided technical advice to schools seeking to improve their grounds as wildlife study areas.

MassWildlife Photographer Bill Byrne consistently captures outstanding images. Above, a gobbler in prime habitat, below, the rare Spadefoot Toad.



Formal or School-Based Programs Project WILD

Twenty-seven WILD Facilitators conducted 24 workshops (9 WILD, 3 Aquatic, 12 combination WILD/Aquatic WILD) reaching a total of 366 educators across the state as well as four environmental educators from the Middle East. There were a number of workshops

offered to EOEa employees that highlighted activities from Project WILD, WET, and PLT. These workshops were a result of the EOEa's Secretary's Education Initiative and the move to encourage state employees to participate in the MA SERVICE (State Employees Responding as Volunteers in Children's Education) Program.

The Annual Facilitator Gathering was held at the Green Briar Nature Center & Jam Kitchen, Sandwich. Twenty-eight facilitators enjoyed a day of camaraderie, updates, recognition, and fun.

A Project WILD/WET/PLT Facilitator Cross-Training took place in March at Grotonwood Conference Center, Groton MA with 26 enthusiastic educators.

Junior Duck Stamp Program (JDS)

This "conservation through the arts" program drew over 638 pieces of artwork from all parts of the Commonwealth. Entries were received from twenty-eight K-12 schools. Judging by a panel of wildlife artists and educators took place at Great Meadows National Wildlife Refuge. The artwork selected as best of show, created by 14 year old Jeanne Cheng of Andover, represented MA at the national competition. Various subsets of the top 100 pieces of art were part of a traveling JDS exhibit that reached twelve different venues throughout the state.

Envirothon

MassWildlife staff shouldered a large part of the task of developing the event. Staffers Pam Landry and Jim Lagacy conducted teacher and student workshops, served on the education committee, prepared the wildlife exam, and attended monthly planning meetings. This year the MA Envirothon was held at Borderland State Park, Easton.

Canon [National] Envirothon

The national Envirothon competition (Canon Envirothon) was held in Massachusetts in 2002. This event brought 250 students from almost all 50 states, to Massachusetts for the final competition in which the top teams from all participating states competed against each other. The site selected was central Massachusetts. The Current Events topic was invasive species. Marion Larson served as Education Coordinator and team leader for the current events segment. Ellie Horwitz headed up the Wildlife Information segment.

Non-Formal Education Programs

Angler Education Program

The Angler Education Program is the main component of *MassWildlife's* Aquatic Resource Education Program. The other two components are Aquatic Project Wild, and Watershed Education. The Angler Education Program has several parts: fresh water fishing festivals, basic fresh-water fishing classes, fresh-water fishing clinics, and a fishing tackle loaner program through which angling equipment is provided to civic and community groups for special events.

The Angler Education component is staffed by volunteers. There are approximately 100 active volunteer

instructors in 10 workshop groups throughout the state. Recruitment takes place at the various winter sportsmen's shows, and by word of mouth. The program was on display at three major sportsmen's shows during FY 02, Worcester, Boston (Wilmington), and Springfield. Instructors are trained through organized four-week instructor training classes, or by apprenticing within a given workshop group. FY 02 saw two former instructors return, and five new instructors begin service as apprentices.

Fishing Festivals: There were 17 events set up specifically as fresh water fishing festivals; two of them were special needs events held for the Disabled American Veterans. These festivals ranged in size from 50 participants to 1,700. An effort is made to make these events educational with various learning stations (knot tying, casting, fish I.D., bait station, equipment, etc.). Total participation for FY 02 was estimated at 6,600 people.

Four-Week Basic Fresh-Water Fishing Classes: There were 12 of these events with approximately 350 participants. Six groups (Nashoba Valley, Newton, North Shore, Pioneer Valley, Shrewsbury, and Rehoboth) put on these classes.

Fresh-Water Fishing Clinics: Although short in duration, these programs, seem to be the most popular offering. Clinics last two to three hours. They consist of a short lecture on the basics of angling followed by a healthy dose of fishing. Handouts are provided, and class participation is kept small enough to allow the instructors to work with participants one on one. There were 41 such clinics in various parts of the state during FY 2002. They were conducted by the Coordinator, seasonal Assistant Coordinator, and various volunteers. Nearly 1000 individuals (mostly children) participated.

Tackle Loaner Program: The Angler Education Program maintains fishing equipment in Westboro for loan to various groups throughout the state. Along with the rods and reels, we also make available the necessary terminal tackle, and a variety of education materials. On 20 separate occasions equipment totaling 635 rods and reels was loaned to various groups including MDC and DEM installations, scout groups and private organizations.

There are also three off-site tackle loaner program locations (Stoneham and Shutesbury Public Libraries, and Spot Pond in Stoneham) that the Angler Education Program assisted in setting up in 1997, and 2000. These sites reported steady numbers throughout the segment. We helped to establish these sites but do not oversee them.

Newsletter: The program newsletter, *Shortcasts*, was produced once during the year (Fall 2001).

Skills Programs

Hunter Education Program

It is the mission of the Massachusetts Hunter Education Program to protect the lives and safety of the public, promote the wise management and ethical use of our wildlife resources, and encourage a greater appreciation of the environment through education. The Hunter Education Program is a public education effort providing instruction in the safe handling of firearms and other outdoor activities related to hunting and firearm use. Funding is derived from the sale of hunting and sporting licenses, and from federal excise taxes on firearms and archery equipment. Massachusetts offered its first hunter safety course in 1954, and to date has graduated more than 130,000 students. The program is jointly administered by the Massachusetts Division of Fisheries and Wildlife and the Massachusetts Environmental Police. Courses are taught by trained volunteer instructors. All courses are offered free of charge.

Courses:

A total of 3,865 students participated in the Hunter Education Program in FY 2002. Participation levels increased 15.6% from FY2001 (3,343 students) and are close to the Five-Year goal of 4,000 students per year. Courses were offered in six disciplines. The following is a summary of course offerings and statistics on student participation:

Basic Hunter Education: Courses provide information on the safe handling and storage of hunting arms and ammunition, hunting laws and ethics, wildlife identification, wildlife management, care and handling of game, basic survival skills and first aid.

- Seventy courses were offered. A total of 2,710 students participated, 2,252 successfully completed the course. Students are asked to volunteer information on age, gender and ethnic background on their registration forms. Four hundred eight-five (485) students were minors (10–14 years old), 436 were 15–17 year old minors, and 43 were minorities. Three hundred thirty-nine (339) women were identified.

Bowhunter Education: Courses are designed for both the experienced and novice hunter. Course topics include the selection of equipment, safety, ethics, bowhunting methods, and care and handling of game. Students may bring their archery equipment to class to obtain advice on its use and care. This certificate is recognized in other states where bow hunter education certificates are required.

- Twenty-three courses were conducted. A total of 796 students participated; 791 successfully completed the course. Seventy-eight students were 10–14 years of age and 55 were 15–17 years of age. Eight minorities and 32 women were identified.

Map, Compass & Survival: Topics include instruction on wilderness survival, as well as the use of a compass

and topographical map for land navigation. Due to the technical nature of the course, it is not recommended for anyone under the age of 12.

- Ten courses were conducted (2 in Pittsfield, 8 in Westminster). A total of 239 students participated, 234 passed. Twelve minors (12–14 year olds) and 14 minors (15–17 year olds) participated. 5 minorities and 56 women were identified.

Black Powder Education: Topics cover the selection of hunting equipment, state laws, the safe handling of muzzleloaders and powder storage. There is a mandatory live-fire segment to the program. *A Certificate of Completion from the Basic Hunter Education course is a prerequisite for all students under 18 years of age.*

- Six courses were conducted. Sixty-five students participated. Fifty-nine successfully completed the course. One minor (15–17 years) participated. Four women and 2 minorities were identified.

Trapper Education: Mandatory for all first-time trappers, this two-day course includes both classroom work and field training. Students learn the proper use of traps and how to set them, the identification of fur bearing animals and their habitat, trapping laws and ethics, and landowner relations.

- Two courses were offered with a total of 43 participants. All participants successfully completed the course. Three women were identified. No minorities or minors attended.

Waterfowl Identification: This course teaches the identification of migratory waterfowl, but also covers the shooting characteristics of steel shot, hunting safely from boats, and the proper use of waders.

- One eight-hour course was held with 12 students participating and successfully completing the course. Three were women.

Shooting Range Development and Enhancement

It is our objective to provide access for the public to range facilities for hunter education and shooting sports purposes by assisting shooting club range development and improvement activities. A total of \$50,000.00 was made available to clubs for Shooting Range Maintenance and Enhancement projects in FY2002. A total of six clubs responded with 18 project proposals. We funded 16 individual project proposals from four clubs. One club did not meet the set deadline to submit its proposal and was not considered. One club would not allow public access as a component of their proposal and ultimately was not considered. The selected clubs were notified of the awards and began work on the projects once all contacts and supporting documentation was finalized. Paid invoices were submitted by the clubs and reimbursed for approved costs associated with the projects. Follow-up site visits were conducted by *Mass-Wildlife* staff.

Becoming an Outdoors-Woman

Becoming an Outdoors-Woman (B.O.W.) is a program designed for women ages 18 and up.

The program provides basic skills instruction to women who have expressed an interest in participating in outdoor activities and field sports. Because of cultural barriers and lack of suitable equipment, women have been and are under-represented among persons who enjoy and feel a commitment to the natural resources of the Commonwealth. To address this, *MassWildlife* offers a program coordinated by one staff member and staffed by volunteer instructors which provides a secure venue for basic instruction in a variety of outdoor activities.

During FY 2002, Becoming an Outdoors-Woman offered:

July 22	On the Uses of Rivers	Charlemont
Aug. 12	Birding at the Beach	Newbury
Aug. 24-26	Backwoods Survival	Leominster
Sept. 7-9	Hunter Education	Townsend
Sept. 22-23	Rock Climbing	cancelled due to weather
October 6	Striper Tagging	cancelled due to weather
Dec. 7-8	Deer Hunt	Devens
March 9-10	Winter Survival Weekend	Leominster
April 27	Birding for Beginners	Sudbury
Apr. 13, May 6	Turkey Hunt	Devens
June 7-9	Full B.O.W. Workshop	Lenox

As in the past, instruction was provided by specialists who volunteered their time and services in order to share their expertise and their passion for outdoor activities with newcomers.

During the year we initiated an electronic notification system through which flyers and registration forms are delivered directly to the client's computer. Events were scheduled about one/month (see above) We solicited funds for program support. In addition to funds received from sponsors we applied for, and received a grant from the Koskela Foundation which enabled the program to purchase flyfishing rods.

Two program alumnae – Nannette Schwartz and Katie Barnicle – produced three excellent issues of a newsletter for The Massachusetts' Outdoor Women's Network (Mass. OWN) the newsletter was sent to all women who have taken part in any BOW workshop.

During this period Massachusetts' B.O.W. coordinator served as coordinator's representative to the International Association of Fish and Wildlife Agencies.

Massachusetts Junior Conservation Camp

As part of preparation for the upcoming camp season, the Section Chief attended a workshop on camp standards to set the stage for ensuring that the MJCC would be in compliance with standards fostered by the American Camping Association. Planning for the summer session proceeded until, in January, we learned that the camp used in previous years was unavailable and that there would be no site for camp in 2002. Steps were taken to advise all potential registrants and sponsors of the fact that for the first time in 50 years the camp would not be held. In March a concerted effort was launched to find an alternate home for the camp for the 2003 season. Ellie Horwitz and Jon Green of the Gun Owner's Action League, explored camps available for rental while Lands Chief Bill Minior moved ahead with an offer to purchase a facility for the camp.

Other Education Initiatives Special Projects

Secretary's Advisory Group for Environmental Education (SAGEE): The Section Chief chaired the group that has oversight of implementation of the Massachusetts Environmental Education Plan. This group is charged with stimulating implementation of *all* parts of the plan as well as monitoring those efforts that are already underway.

Great Falls Discovery Center (GFDC) Development: Although development of the exhibit has been halted temporarily as a result of litigation between the contractor and the US Fish and Wildlife Service, other aspects of the Center's development moved forward. Among these was development of fencing and other visitor safety enhancements at the site. Climate control and lighting functions have been completed for the building and arrangements have been made for securing rights of way needed for the proposed bicycle trail.

Newspapers in Education (NIE): The Section Chief worked with staff of the Hampshire Daily Gazette to sponsor two out of their four issues of special materials for educators. As part of the statewide NIE initiative, participating newspapers print a full page of information on a selected topic once each quarter. This material, directed at teachers, is printed in the daily newspaper. The page is supplemented by a packet of supporting materials that is sent to all participating teachers. *MassWildlife* sponsored and provided material to the Gazette for a page on Water and Watersheds and for a page on Biodiversity.

North American Assn. for Environmental Education (NAAEE) Conference: The North American Assn. for Environmental Education chose Boston as the site for its 2002 annual meeting. Preparation for this event, which brought close to 800 participants and families to Boston's Park Plaza Hotel, was intense. Ellie Horwitz served on the steering committee for this event and co-chaired the Field Trips program which brought hundreds of partici-

pants to key natural resources or key education venues in Massachusetts.

Northeast Information & Education Technical Committee: Pursuant to the committee's five-year plan to enhance agency recognition and credibility with members of the public, the committee moved to the next step. In the past, focus groups were held to identify levels of public recognition. Following this the group has now completed development of an opinion research template which will be available to all participating states and which will establish a baseline assessment of public perception of agency initiatives. To assist states in applying the template, the NEI&E Committee has submitted an application for a grant that would underwrite implementation of this project in cooperating states.

Biodiversity Initiative: I & E staff members worked with administrative staff from the Executive Office of Environmental Affairs to prepare a grant application for the development of a Biodiversity module to be available to all teachers in 2003.

EPO Exam: Marion Larson served as the DFW member of a team reviewing questions for the Environmental Police Officer exam which was given in June 2002.

Further Outreach Exhibits

Exhibits with the table top display were used in a variety of venues — including Tufts Veterinary School Open House, Land Acquisition Events, National Hunting and Fishing Day events in Sturbridge and Ashburnham and many more. Once again, the agency staffed displays at the sportsmen's shows, Topsfield and Franklin County Fairs. New events for displays included table top decoration for the Blackstone River Commission Annual Dinner, New England Pest Management Association Annual Meeting, Massachusetts Grange Meeting and Safari Club International Annual Dinner Meeting. The Southeast District office continues to be the only district office utilizing tabletop displays. They have used them at Freetown Forest, Mashpee and at several land dedication events.

Teaming with Wildlife/Conservation and Reinvestment Act (CARA)

There was little activity on the CARA this year, due to events of September 11 and the closing of Congressional offices because of concern about anthrax. Funding for the State Wildlife Grants has been under discussion. This year, State Wildlife Grant funding was directed towards Biomap and the McLaughlin Hatchery Center projects. Only a few action oriented emails were sent out to the CARA coalition.

Tourism

The most visible tourism related presence for the agency came in the form of binocular logo signs placed by MassHighways this spring directing car travelers to the 67 Wildlife Viewing Sites. This was the final step in the project initiated in 1996 which ties the Viewing Guide, Outdoor Recreation Map and highway signage together. An extensive article in the New England Travel section of the Boston Sunday Globe highlighted these areas.

For the first time, fishing and hunting abstracts were delivered to 12 roadside visitor centers during license distribution for 2002. Abstracts were also shipped out for the Big E where tourism brochures were needed.

Marion Larson attended two regional conferences held by the Mass. Office of Travel & Tourism. As a result of these sessions, Marion was invited to speak at the Berkshires Visitor's Bureau (BVB) monthly luncheon in May. The topic of eco and agri-tourism was well received, with over 50 people attending. The BVB is producing a county outdoor recreation guide and agreed to include *MassWildlife* in the publication, for which we provided a flyfishing image. Publication is due later in 2002.

Clothing

The jackets selected as *MassWildlife* uniform jackets are no longer being made. Section staff located a source of similar jackets and obtained jackets for all employees who did not already have them. Casual green polo shirts were also purchased for staff.

Information & Education Staff

Ellie Horwitz, *Chief*

Bill Byrne, *Senior Photographer*

Bill Davis, *Information Coordinator*

Jill Durand, *Circulation Manager, MASSACHUSETTS WILDLIFE Magazine*

Nancy Lee Fulham, *Receptionist*

Jim Lagacy, *Coordinator, Aquatic Resources Education*

Pam Landry, *Education Coordinator*

Susan Langlois, *Hunter Education Coordinator*

Marion Larson, *Outreach Coordinator*

Peter Mirick, *Publications Coordinator*

DISTRICT REPORTS

Northeast District, Chuck Bell, *Manager*

Southeast District, Steve Hurley, *Acting Manager*

Central District, Chris Thurlow, *Manager*

Connecticut Valley District, Ralph Taylor, *Manager*

Western District, Tom Keefe, *Manager*

The five Wildlife Districts are the field presence of the Division of Fisheries and Wildlife, administering wildlife lands, conducting on-site management, and addressing wildlife issues pertinent to their region.

District staff conduct fisheries and wildlife surveys and gather data for research programs. They release pheasants on Wildlife Management Areas (WMAs) and in open covers and release trout, northern pike and tiger muskies into designated waters. They also operate check stations where sportsmen register deer, bear, turkeys and furbearers taken during hunting and trapping seasons. They serve as agency liaisons with conservation organizations, including many sportsmen's groups. They conduct educational programs within their region, and they respond to media inquiries. District personnel provide advice and technical assistance to persons and/or agencies dealing with problem wildlife situations. In this context, District staff deal with a large number of beaver complaints, deer damage complaints and other issues dealing with the impact of wildlife on human activities.

During the past year, staff from all of the Districts participated in numerous research programs including the annual mid-winter eagle survey, waterfowl inventory and banding, census of mourning doves, woodcock, ruffed grouse and quail. They also monitored water quality of lakes and streams prior to releasing fish into them. District staff scoured the Environmental Monitor for development projects that would affect fisheries, wildlife populations or key fish/wildlife habitat including wetland areas. They provided technical advice on the control of environmental problems — particularly in the handling of nuisance animal situations. District managers served as *MassWildlife's* public relations/education "point persons," spending many hours with civic and sportsmen's groups and responding to inquiries from interested citizens.

All Districts offer programs that introduce visitors to *MassWildlife* and its activities and participate in projects and meetings of sporting and conservation groups in their region.

District staff members monitor and manage the Wildlife Management Areas in their region. This involves cutting brush, mowing, trimming trails, designing forest cutting operations, planting shrubs and maintaining roads and parking areas. They take a primary role in

erecting gates and signs and in making other arrangements related to the protection and management of the agency's lands, buildings and vehicles. They also build and maintain nesting boxes for wood ducks, bluebirds and purple martins, and establish cooperative agreements with farmers raising crops on *MassWildlife's* lands.

District personnel distribute licenses, abstracts, stamps and other materials related to the sale of hunting, fishing, and trapping licenses. They assist officers from the Division of Law Enforcement to assure public adherence to wildlife laws and regulations, and they assist the staff of the Wildlife Lands Section in locating titles, landowners, and bounds — and making arrangements for the acquisition of lands for wildlife.

In addition to the activities that are common to all of the Districts, there are certain projects that require the participation of staff from only certain Districts.

Northeast Wildlife District

Staff of the Northeast District monitored activities at nine Wildlife Management Areas, five sanctuaries and nine boat launching sites. All of these areas receive very heavy public use.

Outreach

Northeast District personnel worked with the Essex County League of Sportsmen's Clubs to promote and conduct the annual youth upland bird (pheasant) hunt at the Martin Burns WMA and the youth waterfowl hunt at Plum Island National Wildlife Refuge. The waterfowl hunt is supported and hosted by the U.S. Fish and Wildlife Service. Staff also developed and managed a special waterfowl hunt at the Delaney WMA. This included construction and placement of blinds and collection of census data.

As part of *MassWildlife's* outreach and education initiatives, personnel from this District designed, constructed and staffed an exhibit at the Topsfield Fair for nine consecutive days with assistance and support of personnel from staff from the Boston and Westboro offices. District staff also assisted at the Fishing and Outdoor Expositions in Worcester and Wilmington. The District Manager and staff biologists gave presentations and participated in 51 meetings including monthly meetings of the Essex, Middlesex and Norfolk League of Sportsmen's Clubs, Watershed Associations, Conservation Commissions, local land trusts and town meetings.

Fisheries surveys were conducted on 16 streams and one river in the Northeast District. Staff also provided support to fisheries biologists in the collection of fish samples from the Charles River drainage. They also continue to assist the Division of Marine Fisheries in the capture of Atlantic salmon and monitoring of anadromous fish passage at the Lawrence Fishway on the Merrimac River.

This District issued two camping permits, 11 field trial permits and over 450 target permits for the range that is maintained at the Martin Burns WMA. Northeast District staff assisted other agency staff in the capture and banding of Canada Geese and waterfowl, and monitored radio-collared white tailed deer as part of a statewide mortality study.

Southeast Wildlife District

District Manager Lou Hambly retired in March of 2002 after 38 years of service. Fisheries Manager Steve Hurley assumed Hambly's duties and took on the role of Acting District Manager. These duties included attending all meetings of the Barnstable, Bristol and Plymouth County Leagues.

Fisheries

Fisheries section staff in this District as in all others, stocked trout and salmon, surveyed ponds and streams, and provided technical assistance to protect and enhance fisheries resources. They conducted environmental review, offered information and education programs, and provided assistance to other sections and agencies.

Forty Atlantic salmon from the Palmer Fish Hatchery were released in October, 2001. An additional 180 Atlantic salmon from the Nashua National Fish Hatchery and 40 Atlantic salmon from the Palmer State Fish Hatchery were released into Little and Long Ponds in Plymouth, Peters Pond in Sandwich and Cliff Pond and Sheep Pond in Brewster in December and another 128 Atlantic salmon from the Nashua National Fish Hatchery were released in January, 2002. In April, another 20 Atlantic salmon from the White River National Fish Hatchery were released into Long and Little Ponds in Plymouth and Peters Pond in Sandwich.

Tiger Muskies were released into South Watuppa Pond in Fall River/Westport in August 2001.

District staff continued to assist the Sandwich Fish Hatchery as requested. This assistance took the form of help with computer operations, developing display materials and in such routine hatchery operations such as trout spawning and unloading of feed.

Survey and Inventory

During the summer of 2001, surveys were completed on five ponds and 22 streams primarily in the South Coastal watershed. A triple pass population survey was conducted on three salter brook trout streams. The annual trout survey on the Quashnet River was accomplished with the help of Trout Unlimited members. Temperature

monitors were checked on a regular basis at three locations on the Quashnet River. Additional temperature monitors were installed in the Mashpee River and the Childs River.

Seven fish kill reports were received between July and September 2001, caused primarily by oxygen depletion. Pilgrim Lake in Truro had a significant die-off of herring in September 2001 due to oxygen depletion and a die-off of common carp in early 2002 due to salinity changes.

Technical Assistance

Local and state agencies, private consulting firms and individuals requested and received technical assistance on matters dealing with the fisheries resources of southeastern Massachusetts. Considerable time was spent in providing technical assistance to the Air Force Center for Environmental Excellence (AFCEE) and to Jacobs Engineering (JE) in relation to the Massachusetts Military Reservation (MMR) cleanup. The Fuel Spill One/bog separation project to control ethylene dibromide contamination of the Quashnet River required continued review to protect the fisheries in that area. An application of alum by AFCEE to control the impacts of phosphorous on Ashumet Pond from the former Otis Air Force base sewage treatment plant required a considerable amount of technical assistance and was accomplished without a fish kill. Staff attended meetings to assist the River Restore program to develop proposals to remove dams from the Satucket River in East Bridgewater, Third Herring Brook in Hanover and the Quashnet River in Mashpee.

Technical assistance and fish sampling was performed for a Cape Cod study of brown bullhead papillomas conducted in the fall of 2001 and spring of 2002 by the U.S. Geological Survey. Fish were collected from Great South Pond in Plymouth, Aaron Reservoir, East Monponsett Pond and Ames Long Pond for contaminant analysis by the D.E.P. Additional fish were collected from nine Cape Cod ponds for a mercury contamination study being conducted by the Cape Cod Commission.

Environmental Review

During the year, staff reviewed the Environmental Monitor for projects which had the potential to affect fisheries resources. Environmental Notification Forms were requested to determine possible impacts and comments were made if fisheries concerns were noted. The fisheries manager was actively involved in monitoring the Massachusetts Military Reservation's cleanup plans as a member of the Plume Containment Team (PCT). A stormwater drainage plan for a development near Basset Brook in Raynham was reviewed, as were plans for a water withdrawal near a Plympton trout farm.

Access Maintenance and Improvement

Bass tournament applications were reviewed and approved for boat ramps at Ashumet, Cooks (Fall River), Great Herring, Johns, Monponsett, and Snipatuit Ponds. Periodic cleanups and inspections were conducted at 18

access areas throughout the District. Input on fisheries issues and resources were provided on proposed land acquisitions throughout the year.

Wildlife

Members of the District's wildlife staff conducted monitoring, technical assistance and check station activities conducted by wildlife section staff in all Districts. They performed habitat improvement and management activities intensively on two Wildlife Management Areas with other management activities such as erection and maintenance of gates conducted at 24 Wildlife Management Areas.

The sale of antlerless deer permits and answering inquiries about them consumed large amounts of District staff time during the fall of 2001.

Permits were issued for seven field trials and six other events at the Crane Wildlife Management Area. Considerable effort was expended on advising AFCEE/JE on ways to minimize the impacts of well drilling and associated road building on the Crane WMA.

District personnel assisted agency biologists with the spring breeding waterfowl survey; with Canada goose capture and banding, and with nesting success studies on four wood duck study areas. Wildlife census routes run by District personnel included eighteen quail routes, two grouse/turkey routes, two mourning dove routes and one woodcock route.

District staff released both pheasants and quail from *MassWildlife's* pheasant rearing facility in Ayer and from Stonewall Farm in Shrewsbury. Quail were purchased from a private vendor. District personnel had to tend to the quail throughout the season. In February 2002, snowshoe hare from Canada were released on three wildlife management areas selected because they had good hare cover. The stocking and hunting of pheasant on the Cape Cod National Seashore became a major issue when the Humane Society of the United States and other groups attempted to pressure the National Park Service to end *MassWildlife's* long established pheasant stocking program.

Nuisance Animal Complaints

During this fiscal year, a number of people were bitten by rabid foxes in Westport and Marshfield. This brought scores of calls from residents who had seen a fox in their yard or neighborhood. Coyote complaints continue to increase — in particular, complaints about coyote depredation on pets and farm animals. The usual number of calls was received regarding nuisance and injured animals. For the first time, a moose was reported in the District and for the first time in recent years, a beaver pelt was brought to the office to be tagged.

Information and Education

Section staff prepared displays for the Marshfield Fair, Freetown's "Fun in the Forest" Day, Ashumet Pond alum treatment information sessions, and the Cape Cod "Ponds in Peril" Conferences. Displays were manned at the

Standish Sportsmen show in January in East Bridgewater and in June at the "Wild about Wildlife Celebration" held by the Friends of the Mashpee National Wildlife Refuge. In addition to providing programs to schools, conservation groups, and providing materials to writers and reporters as requested, the fisheries manager appeared in a news segment on Channel 5 television regarding deer and vehicles.

Assistance to Other Sections/Agencies

The fisheries manager participated in the Watershed Initiative as a member of the South Coastal and Cape Cod Basin teams and provided information as requested to the basin team leaders and served on the Environmental Advisory Committee of the Cape Cod Community Foundation. Close cooperation and communication with the Division of Marine Fisheries continued regarding alewife runs. The fisheries manager conducted a Right to Know Law training session for District personnel.

The Acting District Manager served as *MassWildlife's* representative to the new Southeastern Massachusetts Bioreserve Planning and Working Groups and spent a considerable amount of time helping draft the bioreserve management plan.

Staff provided technical assistance to Natural Heritage's aquatic biodiversity project and to the Nature Conservancy's aquatic biodiversity project. An annual coordination meeting was held with the Cape Cod National Seashore and meetings were held with the Trustees of Reservations and Trout Unlimited to implement the Red Brook memorandum of understanding.

Central Wildlife District Wildlife

Staff in this District conducted all of the wildlife related tasks which are common to all Districts.

District personnel directed five Deer checking stations, two Turkey check stations, and one black bear check station. Ruffed Grouse and Mourning Dove censuses were completed. Personnel assisted in waterfowl inventory flights. Canada Goose census, and summer and fall duck banding was done. Beaver, Otter, Coyote, Fisher, Bobcat and Fox pelts were tagged and recorded. 313 Wood Duck nesting boxes were checked and 77 new boxes were erected. Scheduling and monitoring of district pheasant stocking was completed. District personnel assisted in the annual winter Bald Eagle census, Bluebird and songbird nesting boxes were constructed and erected on WMAs.

Fisheries

District personnel assisted in studies and surveys of the Blackstone and Assabet Watersheds. This included surveys of 22 streams and four ponds.

Public Access

Six boat ramps were inspected and litter was removed. Ramp repairs were made at South Pond, and Little Chauncy Pond. District Personnel assisted and advised Riverways program staff on the Blackstone and Assabet Rivers.

Information and Education

District personnel set up and staffed the agency's booth at the Eastern Fishing Exposition at the Worcester Centrum. "Tags and Trout" programs were conducted at seven areas. The District Manager attended meetings of the Worcester County League of Sportsman Clubs. He and the District Biologists attended meetings with various state and local agencies on such subjects as wetland permits, and other wildlife and environmental concerns.

Technical Assistance

Technical assistance was given to state and local departments on issues such as water pollution, lake associations and open space plans.

Numerous complaints about nuisance animals were investigated and whenever suitable, appropriate action was recommended. In particular the District dealt with a great number of beaver complaints.

Connecticut Valley Wildlife District

In addition to the activities performed by all districts, Connecticut Valley Wildlife District personnel performed maintenance activities on Wildlife Management Areas including brush cutting, trail maintenance, establishing and overseeing Cooperative Agreements. The Valley District also conducted the annual controlled waterfowl hunt at the Ludlow WMA. This includes maintenance and administrative activities associated with the hunt.

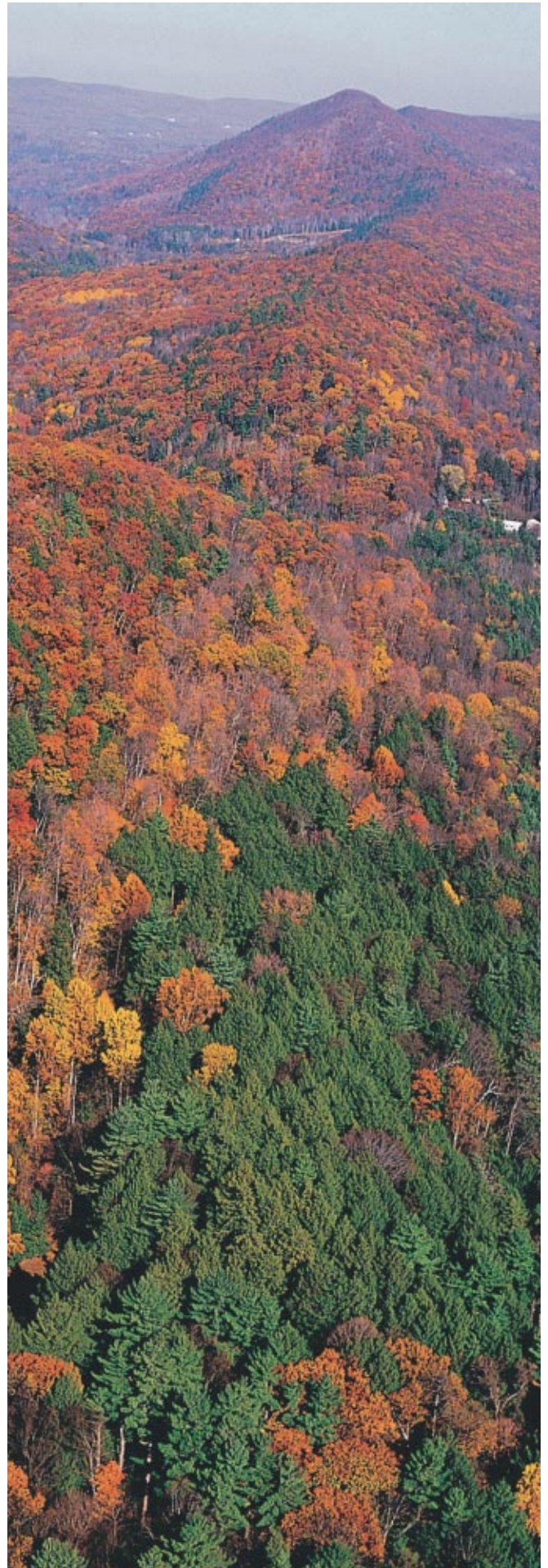
Wildlife

District staff participated in surveys of ruffed grouse, woodcock, and waterfowl. They also took part in the mallard/black duck survey, and the wood duck productivity study.

- District Staff have been involved in a number of special projects for the Natural Heritage Section. These include rappelling for Raven banding at a record number of sites, assisting with the reconstruction of an eagle nest at Barton's Cove on the Connecticut River and accomplishing the technical support for the banding of the peregrines in Springfield, MA.

- The Valley District has the major field responsibility for the Black Bear Project, coordinating and conducting mid-winter field trips to replace aging radio-collars on study bears while in their den and conducting radio telemetry to monitor bear movements.

- This District conducts a large part of the eagle restoration project; monitoring, climbing for, and banding eagles throughout the state. This also included working cooperatively with the Conte Refuge to



emplace a camera (EagleCam) which provides Internet access to eagle nest activities at the Barton's Cove nest site.

- The District continues to have a key role in loon observations at the Quabbin Reservoir. District staff constructed and deployed four new loon rafts this year, and provided another to be deployed by MDC staff at Wachusett Reservoir.

Fisheries

Fisheries staff conducted stream surveys and pond surveys, netted lake trout at Quabbin Reservoir in conjunction with the Quabbin Anglers Association, and conducted a Quabbin Creel Survey.

In addition to the standard brood stock Atlantic salmon, trout, northern pike and tiger muskie releases, the Valley District stocked the Quabbin Reservoir with salmon smolts, originating from the Roger Reed Hatchery.

Information and Education

Staff of this District have been involved in the Springfield Sportsman's Show, the Franklin County Fair and Earth Day at the Springfield Science Museum. These public events are attended by thousands of people and provide the agency with a good deal of positive public relations. In addition to participating in these events, staff have been active with school groups and local area colleges and universities, including the Quabbin Stocking event, providing presentations relevant to *MassWildlife's* mission.

The District Manager attended regular meetings of the Franklin, Hampshire and Hampden County Leagues as well as many individual club meetings, select board meetings, Conservation Commission meetings. The District Fisheries Biologist has attended many meetings for the Deerfield, Westfield and Chicopee watersheds.

The District hosted many activities and meetings at its meeting/classroom facility including meetings of the Fisheries and Wildlife Board, deer aging workshops, programs for local school groups, hunter education classes and more.

The Valley District provided logistical support and hosted a day of activities for the 2002 National Envirothon.

District staff maintained and repaired various pieces of agency equipment including the fisheries section's electro-shocking boat, the lake trout survey boat and the Natural Heritage Section's whale recovery boat.

Western Wildlife District

District staff banded 200 Canada Geese, set up an electric fence to prevent a black bear from entering a dwelling, and handled 30+ beaver complaints on an advisory basis. They conducted fisheries surveys on more than 30 streams, rivers and ponds for inclusion

into the statewide database and they continued efforts to remove invasive water chestnut from a local pond.

District personnel participated in a special deer trapping-and-collaring population study in Deer Management Zone 2 and in a beaver study which covered all of Berkshire County.

They installed gates on two new Wildlife Management Areas and released apple trees on two others. They conducted surveys to find specimens of two state listed plants, *Rosa acicularis* and *Hydrophyllum canadense* on two WMAs. They also conducted a breeding bird survey on the Hy Fox WMA. A special use permit was issued to the Nature Conservancy to conduct invasive plant control on the Jug End WMA and State Reservation as part of a groundbreaking "Weed it Now" initiative.

The District Wildlife Biologist attended three pesticide re-certification classes, participated in a mussel survey on the Housatonic River in Great Barrington, and assisted the Division of Law Enforcement in investigating snowmobile and ATV trespassing on WMAs.

The District Fisheries Biologist presented data and information to the Westfield and Farmington River Watershed Teams, the Lakes and Ponds Assn. (LAPA) West Conference, Taconic and Pioneer Chapters of Trout Unlimited, and a Project WILD workshop. He also appeared on a public access cable show hosted by the Berkshire County League of Sportsman. The Fisheries Biologist worked with D.E.P. and watershed teams in designing watershed assessment protocols and began design and writing of a fisheries management plan for the Housatonic Watershed. He also served as *MassWildlife's* representative on the inter-agency Natural Resource Conservation Service (NRCS) Emergency Response Team and participated in numerous environmental reviews including reviews of the Hoosic River Flood Chute Restoration project and issues related to flows in the Deerfield River.

As a member of the Kamposoa Bog Stewardship Committee, the District Manager continued to participate in the implementation of the Kamposoa Bog Drainage Basin A.C.E.C. Management Plan. He also spent many hours attending meetings with D.E.P., the U.S.E.P.A., the Housatonic Watershed Team Leader, and the Citizens Coordinating Council relative to PCB contamination and restoration of wildlife habitat along the Housatonic River. The District Supervisor was also a guest along with the Pittsfield Police Chief and ACO discussing response and advice regarding problem black bears in residential areas.

District Manager attended meetings of the Berkshire County League of Sportsmen's Clubs. District Staff participated in *MassWildlife's* "Becoming an Outdoors-Woman" program by conducting workshops in "Reading Wildlife Sign" and "Birding for Beginners" and presenting programs as requested by local civic and conservation groups.

District Personnel

Northeast Wildlife District

Chuck Bell, *District Supervisor*
Erik Amati, *Wildlife Biologist*
Peter Jackson, *Aquatic Biologist* (Ret. 3/15/02)
Frank O'Meara, *Martin Burns WMA Supervisor*
Bob Desrosiers, *Wildlife Technician*
Sue Ostertag, *Clerk*
John Sheedy, *Wildlife Technician* (to 3/15/02), *Acting Aquatic Biologist* (from 3/15/02)
Walter Tynan, *Wildlife Technician*
Steve Wright, *Wildlife Technician*
Dennis McNamara, *Land Acquisition Agent*

Southeast Wildlife District

Lou Hambly, *District Supervisor* (Ret. 3/15/02)
Richard Turner, *Wildlife Biologist*
Steve Hurley, *Aquatic Biologist & Acting District Supervisor* (Beg. 3/16/02)
Jeffrey Breton, *Wildlife Technician*
Daniel Fortier, *Wildlife Technician*
Ed Kraus, *Wildlife Technician*
Camie Marsh, *Clerk*
Salvatore Paterno, *Wildlife Technician*
Joan Pierce, *Land Acquisition Agent*

Central Wildlife District

Chris Thurlow, *District Supervisor*
Vacant, *Wildlife Biologist*
Mark Brideau, *Aquatic Biologist*
Bob Chapin, *Wildlife Technician*
Brian Guerin, *Wildlife Technician*
Paul Le Boeuf, *Wildlife Technician*
Priscilla MacAdams, *Clerk*
Paul Orrizzi, *Wildlife Technician*
Position Vacant, *Land Acquisition Agent*

Connecticut Valley Wildlife District

Ralph Taylor, *District Supervisor*
David Fuller, *Wildlife Biologist*
David Basler, *Aquatic Biologist*
Barbara Bourque, *Clerk*
Adam Davies, *Wildlife Technician*
Gary Galas, *Wildlife Technician*
Rick Gamelin, *Wildlife Technician*
James Wright, *Wildlife Technician*
Will Steinmetz, *Land Acquisition Agent*

Western Wildlife District

Tom Keefe, *District Supervisor*
Anthony Gola, *Wildlife Biologist*
Andrew Madden, *Aquatic Biologist*
Dale Beals, *Wildlife Technician*
Elna Castonguay, *Clerk*
Joseph Kirvin, *Wildlife Technician*
Nancy Lamb, *Wildlife Technician*
Jerry Shampang, *Wildlife Technician*
Peter Milanese, *Land Acquisition Agent*

WILDLIFE LANDS

William J. Minior
Chief of Wildlife Lands

The Wildlife Lands Section completed 78 acquisitions in FY 02 protecting nearly 8,000 acres of open space. The Connecticut Valley was high District with over 3,500 acres protected and now available for compatible recreational use. The Western and Southeast Districts had an outstanding year as well with over 2,500 acres protected in each District. Some 1,560 acres were protected in the Central District and the Northeast did a respectable 417 acres. Sixteen and a half million dollars was expended directly on land in FY 02. The land protection effort resulted in a very productive year for all Districts.

The extensive amount of acreage protected was in large part a direct result of the Governor's and Secretary's desire to reach projected acreage goals. Additional funds were made available through the Secretary's office for agency priorities as well as specific project areas. The combination of additional funding and a concerted effort to protect acreage through Conservation Restrictions (CRs) resulted in the protection of many parcels that may not have been protected otherwise.

The North Quabbin (NQ) area continued to be a priority of the Secretary's office and acquisition efforts there resulted in *MassWildlife's* protection of approximately 2200 acres in the Connecticut Valley and Central Districts. Acquisitions in the NQ area occurred in five distinct areas, Tully Mountain, Tully River, Millers River, Lawrence Brook, and the Orange WMAs. Most NQ parcels are protected through CR's that allow compatible public uses, including hunting, however a significant amount of acreage was acquired in fee.

Conservation Easements (CEs) of particular interest include the Springfield Water and Sewer Commission's 1,750 acre Ludlow Reservoir, the Berkshire Natural Resources Council's conveyance of the 597 acre Alford Spring tract along the NY border in the Town of Alford, the 293 acre Santuit Pond CE from the Towns of Barnstable and Mashpee, and the thirty acre Acushnet River CE acquired with funding from the cleanup remediation of New Bedford Harbor.

Non-profit organizations assisted in our land protection efforts directly through pre-acquisition and conveyance and indirectly through negotiations and due diligence. Various types of assistance were provided by the Mass. Audubon Society, The Trustees of Reservations Mass. Land Conservation Trust, the Wildlands Trust, the Valley Land Fund, the Nature Conservancy, and the Berkshire Natural Resources Council Inc., Essex County Greenbelt and the Essex County Sportsmen's Association.

More closings were completed in FY 02 than in any previous year and prospects for the immediate future look promising as well. These efforts have increased *MassWildlife's* total protected acreage to approximately 132,740 acres statewide.

Fiscal Year 2002

Western District

Expended	\$1,562,900.00
Acreage	2,683.5
Cost/acre	\$573.23

Valley District

Expended	\$3,597,520.00
Acreage	3,558.3
Cost/acre	\$1,011.02

Central District

Expended	\$1,781,455.00
Acreage	1,560.1
Cost/acre	\$1,141.92

Northeast District

Expended	\$1,126,000.00
Acreage	417.4
Cost/acre	\$2,699.59

Southeast District

Expended	\$8,514,100.00
Acreage	2,544.7
Cost/acre	\$1,501.17

TOTAL EXPENDED: **\$16,581,975.00**

TOTAL ACREAGE ACQUIRED: **10,764.5**

AVERAGE COST PER ACRE: **\$1,540.50**

Above figures include Departmental acquisitions. It should be noted that the acreage figures and costs of those properties acquired with FY 02 funds and all property RECORDED in FY 02 between 8/3/01 and 8/9/02 are included herein. Ancillary costs are not included.



Canoers enjoy the waters of Long Pond and the Tully River in Royalston.

Western District

Seventeen acquisitions including land in eleven towns and in eleven distinct areas were completed in the Western District in FY 02. Conservation Easements accounted for approximately 980 of the total 2,683 acres protected district wide. Direct land protection costs were approximately \$573.00 per acre. A new WMA was added along with two Wildlife Conservation Easements. Day Mountain WMA consists of 332 acres and lies just southerly of the Town of Dalton. It is an excellent wildlife resource and of considerable NHESP importance. The 220 acre Berkshire Plateau WCE forms a significant link between *MassWildlife's* Peru WMA and the Dalton Fire District WCE while the Alford Spring WCE in the Taconic Range abuts extensive public holdings in adjoining NY State.

The largest contiguous WD acquisition in FY '02 was the 780 acre tract acquired from the BNRC, Inc. which abuts the AP trail and is now part of *MassWildlife's* largest area, the 6,437 acre Chalet WMA. It is part of a huge assemblage of protected open space in what is referred to as the Northern Berkshire Plateau.

The Crane family and Company through sale and gift conveyed the fee or CR interest to *MassWildlife* on over 500 acres on Day Mountain and the Berkshire Plateau. Bill Hull also conveyed through sale or gift fee and CR interest on nearly 400 acres.

A generous gift from Jay Brill added 25.1 acres to our Peru WMA. Substantial acreage was also added to the Agawam Lake WMA, Dolomite Ledge NHA, Fox DEN WMA, Lily Pond WMA, and Mt. Tekoa WMA.

Connecticut Valley District

The Valley District completed 25 acquisitions protecting approximately 3,560 acres of land. This matches the number of acquisition of the previous year but includes substantially more acreage. The 1,750 acre Ludlow Reservoir CR acquired from the Springfield Water and Sewer Commission abuts *MassWildlife's* 1,556 acre Facing Rock WMA and is the largest parcel protected during FY 02. The North Quabbin project continued with major additions to the Orange WMA and the Tully Mountain area. Land protection efforts in 02 resulted in additions to fifteen different areas held or managed by *MassWildlife*.

The Ludlow Reservoir CR represents the largest CR in the Valley District. It will open the 1,750 acre tract to compatible recreational use including shore fishing on the 400+ acre reservoir. When combined with the abutting WMA, at 3,300+ acres it is by far largest tract of open space protected by *MassWildlife* in the Valley. Six tracts with a combined total of over 650 acres were added to the Orange WMA increasing it to nearly 1,700 acres in size. Major additions to Catamount, Palmer and Whately WMAs were also completed in FY 02.

Two new areas included the previously mentioned Ludlow Reservoir and also the 131 acre Southampton

WMA were established in FY 02. Several acquisitions were of considerable Heritage importance including additions to our Mount Tom and Honey Pot Road Natural Heritage Areas. This was a very productive year increasing total acreage in the Valley protected by *MassWildlife* to nearly 20,000 acres.

Central District

Nineteen acquisitions were completed in the Central District for a total of 1,560 acres protected. This represented acquisitions in twelve different areas including four in the North Quabbin (NQ) area. The four NQ areas that combined for eleven acquisitions include Fish Brook, Lawrence Brook, Millers River and the Tully River area. Conservation Restrictions/Conservation Easements including public access, accounted for approximately one-third of the total acreage protected in the Valley in 02.

New areas for the Central District include the Ashby and Tully Mountain WMAs that both extend into abutting districts. As our land protection efforts increase District overlap is inevitable. Additions to several WMS including major additions to our Bolton Flats and Coy Hill WMAs were also completed in 02.

Two new pond access tracts were acquired including the 16 acre Mossy Pond and .25 acre South Meadow Pond access points in the Town of Clinton.

Northeast District

The Northeast District continues to be the most difficult District in which to acquire/protect large tracts however the District was successful in completing eight acquisitions on four separate areas. The largest and most publicized acquisition was unquestionably the 280 acre Mount Watatic tract that included 231 acres in Ashby. This purchase included the peak and surrounding acreage and more importantly prevented the development of a proposed tower that would have had significant aesthetic impact on the entire area. Acquisition assistance/funding was provided by DEM, Self Help and the Ashby and Ashburnham Land Trusts. This parcel along with abutting DEM and DFW property will remain undeveloped and open for various compatible recreational use.

The relatively new Salisbury Marsh WMA was the beneficiary of four new acquisitions totaling eighty five acres. These tracts are in the immediate vicinity of the 310 acres acquired from the New England Power Company in FY 01. Two additions to our Crane WMA and one to our Nissitissit WMA insured more habitat protection and recreational opportunity.

A combination of fragmented landscapes, dense human population, and high costs generally make land acquisition in the Northeast district a difficult task. Increased efforts to identify additional focus areas and focus areas should assist in future acquisition/protection in this densely populated region.

Southeast District

Over twenty-five hundred acres were protected in the SE at a cost of approximately 8.5 million dollars. This effort consisted of ten acquisitions in nine separate areas. The relatively large amount of acreage was due primarily to the extensive Northland Cranberry acquisition in the Towns of Hanson and Halifax, consisting of 1,638 acres. The seemingly large consideration for SE acquisitions is due primarily to the fact that real estate is considerably more expensive in the eastern part of the state.

The Northland acquisition included 272 acres of cranberry bog with surrounding upland and wetland acreage. It includes Upper and Lower Burrage Ponds, provides extensive habitat and offers a variety of recreational opportunity including bird watching, hiking, biking, fishing and hunting.

The 294 acre Santuit Pond Wildlife Conservation Easement (WCE) was acquired in conjunction with the Towns of Barnstable and Mashpee and will protect this valuable resource in perpetuity. The Towns purchased and will retain the fee in the subject property. Phase III of the Hawes acquisition added nearly 300 acres to the Copicut WMA in the Towns of Fall River and Dartmouth, completing the conveyance from the Hawes family. The 30.6 acre Acushnet River WCE was acquired with mitigation funds from the New Bedford Harbor settlement and represents a new WCE area.

Land Agents

Peter Milanesi, *Western District*
 Bill Steinmetz, *Connecticut Valley District*
 Phil Truesdell, *Central District*
 Dennis McNamara, *Northeast District*
 Joan Pierce, *Southeast District*

Western District

Wildlife Management Areas: 31	Acres	Tract #
Agawam Lake	779.8	254
Becket	239.6	60
Chalet	6,437.1	86
Cummington	194.0	240
Day Mountain	332.4	264
Eugene Moran	1,462.4	91
Farmington River	688.0	211
Fisk Meadows	580.2	88
Fox Den	3,706.7	100
Green River	489.2	125
Hancock	204.0	123
Hinsdale Flats	1,478.2	89
Hiram H. Fox (formerly Canada Hill)	2,951.0	48
Hop Brook	424.8	112
Housatonic Valley	817.9	67
John J. Kelly	267.0	85
Jug End*	1,233.8	191
Knightville	721.0	244
Lilly Pond	281.7	255
Maple Hill	345.1	148

Mica Mill Brook	812.0	243
Mount Plantain	672.4	241
Mount Tekoa	1,261.0	231
Otis	83.5	124
Peru (Includes Tracy Pd.)	4,673.3	30 & 113
Powell Brook	224.0	115
Savoy	1,282.8	64
Stafford Hill	1,591.6	56
Taconic Mountain	157.3	232
Three Mile Pond	1,095.5	181
Walnut Hill	<u>812.0</u>	190
	36,254.3 acres	

*Jointly owned and managed with DEM

Wildlife Conservation Easements: 11

Alford Spring	640	269-1
Ashfield	101	247-1
Berkshire Plateau	220.4	261-1
Blanford	986	249-1,2&3
Chesterfield	491	248-1&2
Dalton Fire District	2,568	253-1
Goshen	194	251-1
Huntington	78	250-1
New Marlborough	239	246-1
Sandisfield	692	245-1,2&3
Tyringham	<u>320</u>	252-1
	6,486.4	

River Access Areas: 4

Hoosic River	5.9	213
Housatonic River	27.5	103
Konkopot River	8.8	114
Westfield River (W)	<u>373.0</u>	94
	415.2	

Wildlife Sanctuaries: 2

E. Howe Forbush	268.0	16
Grace A. Robson	<u>69.5</u>	24
	337.5 acres	

Wildlife District: 1

District Headquarters	2.1	13
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Natural Heritage Areas: 7

Bullock Ledge	15.5	212
Dolomite Ledges	198.3	227
Fairfield Brook	203.3	226
Jug End Fen	38.8	147
Kampoosa Fen	72.0	173
Lanesboro	88.6	233
Nordeen Marsh	<u>22.9</u>	102
	639.4	

Forest: 1

Windsor 110.0	<u>116.0</u>	
TOTAL WESTERN DISTRICT	44,244.9 acres	

Valley District

Wildlife Management Areas: 26	Acres	Tract #
Catamount 413.0	119	
Coy Hill(V)	201.6	221
East Mountain	241.5	202
Facing Rock	1,556.1	179
Herman Covey***	1,475.1	49
Lake Warner	94.8	180

Leadmine(V)	344.0	170
Leyden	359.0	200
Millers River(V)	65.84	A62
Montague	1,449.6	118
Montague Plains	1,493.0	234
Mount Toby	255.5	222
Orange	1,677.2	229
Palmer	982.3	178
Pauchaug Brook*	161.3	74
Poland Brook	618.7	70
Satan's Kingdom**	1,867.9	107
Southampton	130.9	262
Tully Mountain	1,116.6	225
Wales	207.1	172
Warwick	172.0	126
Wendell	585.7	144
Westfield	227.0	174
Whately	340.6	182
Whately Great Swamp	297.5	235
Williamsburg	88.0	127
16,421.9 acres		

*WMA and Connecticut River Access

**Acreage includes 402.5 acres of CR

***Combination-Hatchery(McLaughlin), WMA and District Hdqtrs.

Wildlife Conservation Easements: 2

Ludlow Reservoir	1750.0	271
North Quabbin CRs		257
New Salem	59.0	
Tully River	250.0	
	2,059.0	

Islands (Connecticut River): 2

Shepherd's Island	15.0	80
Sunderland Islands(2)	9.0	189
	24.0	

Fish Hatcheries: 4

Bitzer	150.6	7
McLaughlin (incl. in Herman Covey WMA)		
Reed	301.0	8
Sunderland	47.7	9
	499.3	

Game Farm: 1

Wilbraham*	137.2	4
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*Turned over to Town in 99. CR retained on 137.2 acres.

River Access: 9

Connecticut River	70.8	117
Deerfield River	20.5	201
Green River(V)	29.5	185
Mill River	23.0	239
Sawmill River	51.0	176
Sibley Brook	13.39	152
Tully Brook	77.0	177
Ware River(V)	14.0	A63
Westfield River(V)	76.8	111
	376.0	

Pond Access: 3

Little Alum Pond	0.5	128
Lake Lorraine (PAB)	0.26	129
Lake Rohunta	2.52	209
	3.28	

Natural Heritage Areas: 5

Rainbow Beach	30.9	142
Mt. Toby Highlands NHA	100.0	159
Mt. Tom	72.7	238
Darwin Scott Memorial	27.3	157
Honey Pot NHA	131.4	175
	362.3	

TOTAL VALLEY DISTRICT 19,883.0 acres

Central District

Wildlife Management Areas: 39		Acres	Tract #
Ashby		48.5	134
Bennett		281.2	A77
Birch Hill		3,356.2	50
Bolton Flats		1,127.3	90
Breakneck Brook 1,409		.0	158
Coy Hill***		549.2	221
E. Kent Swift		200.5	84
Fish Brook		221.0	130
Four Chimneys		200.0	77
High Ridge*		2,049.0	98
Lackey Pond		150.5	165
Lawrence Brook		947.5	108
Leadmine(C)		296.0	170
Martha B. Deering		181.6	237
McKinstry Brook		226.3	184
Merrill Pond (System)		729.0	10
Millers River(C)**		3,338.3	62
Mine Brook		710.5	258
Moose Brook		495.3	132
Moose Hill		567.1	59
Muddy Brook		906.0	167
Oakham		690.6	153
Palmer***		208.0	178
Phillipston		3,411.3	31
Popple Camp		1,161.0	A31
Poutwater Pond (formerly North Street)		378.0	133
Prince River		749.0	113
Quaboag River		1,673.6	55
Quacumquasit		179.9	131
Quisset		507.1	196
Raccoon Hill		416.0	151
Richardson		467.2	106
Savage Hill		1,109.7	150
Thayer Pond		131.0	171
Tully Mountain		119.5	225
Ware River(C)		291.4	63
Westboro****		894.6	35
Winimuset		651.1	61
Wolf Swamp		913.9	217
		31,942.8 acres	

*Management and control under DFW 1,673.7 ac

DFW owned in fee 282.0 ac

**Acreage includes 15.72 acre CR

*** Listed and managed under Conn. Valley District

**** 467 acres added from a 97 DCAM transfer

Wildlife Conservation Easements: 2

North Quabbin CRs		257
Phillipston (Secret Lake)	212.0	
Tully River	6.6	
	218.6	

Wildlife Sanctuaries: 2

Susan B. Minns	140.0	20
Watatic Mountain	<u>100.0</u>	25
	240.0	

River Access Areas: 4

Five Mile River (incl. 17 acre CR)	195.5	120
Natty Brook	95.2	220
Quinapoxet River	32.0	66
West & Blackstone Rivers	<u>28.0</u>	76
	350.7 acres	

Natural Heritage Areas: 3

Podunk Marsh	15.0	104
Clinton Bluff NHA	42.0	154
Quag Pond Bog	<u>31.0</u>	197
	88.0	

Conservation Restriction: 5

Carter Pond	280.0	155
Burnshirt River	5.64	160
Hunting Hills*	53.7	183
Quabbin	28.0	161
Stillwater River	<u>29.0</u>	162
	396.3	

*Part of Hunting Hill WMA in NE Dist.

Marshes: 1

Quinsigamond Marsh	59.0	156
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Pond Access: 6

Cusky Pond	23.75	163
Fisherville Pond	1.6	166
Glen Echo Lake	1.0	149
Mossy Pond	16.1	267
South Meadow Pond	0.25	266
Sputtermill Pond Area	<u>58.5</u>	164
	101.2	

Forest: 2

Hamilton	70.0	75
Northboro	<u>88.8</u>	51
	158.8	

TOTAL CENTRAL DISTRICT 33,555.4 acres

Northeast District

Wildlife Management Areas: 10	Acres	Tract #
Ashby	931.0	134
Crane Pond	2,235.6	38
Hunting Hills* 35	6.4	183
Martin H. Burns	1,554.5	37
Mulpus Brook	177.7	203
Nissitissit River	364.9	71
Pantry Brook	410.9	29
Salisbury Marsh	395.0	
Squannacook River**	1,045.8	53
William Forward	<u>2,122.5</u>	36&82
	9,594.3	

*Includes 53.7 acre CR in CD

** 21 acres title vested in DEM

Wildlife Sanctuaries: 5

Carr Island	110.5	18
Egg Rock	2.0	17
J.C. Phillips	391.0	15

Milk Island	29.0	19
Ram Island	<u>20.0</u>	23
	552.5	

Game Farm: 1

Ayer	96.9	1
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Wildlife District: 1

District Headquarters	1.9	11
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Pond System: 1

Flint Pond	81.9	28
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Forest: 2

Acton	36.0	207
Townsend	<u>60.0</u>	33
	96.0	

Pond Access: 4

Knops Pond	0.6	52
Mascopic Lake	0.3	65
Baddacook Pond	0.16	A52
Long Sought For Pond	<u>1.0</u>	143
	2.06	

Salt Marsh: 1

North Shore	335.65	47 & 58
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Stream Access: 6

Concord River	4.7	97
Ipswich River	1.8	204
Nashua River	68.5	110
Trapfall Brook	45.4	109
Sudbury River*	139.1	121
Weymouth Back River**	<u>16.4</u>	135
	275.9	

Natural Heritage Areas: 4

Boxboro Station	25.5	188
Eagle Island	5.0	199
Elbow Meadow	132.8	101
Hauk Swamp	<u>55.0</u>	206
	218.3	

TOTAL NORTHEAST DISTRICT 11,255.3 acres

*Held jointly with D.E.M.

**Departmental acquisition

Southeast District

Wildlife Management Areas: 18	Acres	Tract #
Burrage Pond	1,638.0	265
Copicut	3,706.8	141
Dartmoor Farms	473.0	236
Erwin Wilder	450.0	A83
Frances A. Crane	1,912.8	27
Gosnold	3.5	96
Haskell Swamp	2,787.7	218
Hockomock Swamp	4,453.7	83
Hyannis Ponds *	357.0	187
Meetinghouse Swamp	109.0	214
Noquochoke	204.6	208
Peterson Swamp	250.0	81
Purchade Brook	120.0	215
Red Brook	400.0	260
Rochester	70.0	57
Rocky Gutter	3,038.7	68
Taunton River	179.0	219

West Meadows	<u>221.9</u>	34	Poponesset Beach	2.0	41
	20,375.7		Springhill Lot	<u>7.0</u>	44
				224.2	
Wildlife Conservation Easements: 3			Hatchery Land: 1		
Acushnet River	30.2	263	No. Attleboro Hatchery	36.5	99
Camp Cachalot	789.0	223			
Santuit Pond	<u>293.0</u>	268	Marsh Management: 1		
	1,112.2		Eastham Area	7.4	136
Wildlife Sanctuaries: 4			Fisheries & Wildlife Area: 2		
Billingsgate Island	0.5	14	Muddy Pond	72.0	95
Penikese Island	60.0	21	South Barrier Beach(Leland)	<u>99.5</u>	194
Ram Island	2.0	22		171.5	
Tarpaulin Cove	<u>4.5</u>	93			
	67.0		Natural Heritage Areas: 11		
Wildlife District: 1			Grassy Pond	59.4	168
District Headquarters	23.8	12	Grassy Pond Dennis	7.2	230
Fish Hatcheries: 1			Harlow/Cooks Pond	51.9	145
Sandwich	60.0	5	Head of the Plains	2.0	138
Game Farm: 1			Katama Plains *	18.5	140
Sandwich	133.0	3	Mashpee Pine Barrens	193.2	105
Salt Marsh: 5			Miacomet Heath	3.8	186
Brayton Point	2.2	169	Olivers Pond	12.0	139
Chase Garden Creek	56.4	205	Sly Pond	192.0	137
English	191.5	146	South Triangle Pond	10.3	198
Fox Island	82.5	192	Thad Ellis	<u>1.5</u>	195
South Shore	<u>22.4</u>	69		556.7	
	355.0		TOTAL SOUTHEAST DISTRICT	23,801.9 acres	
Stream Access: 5					
Childs River	0.2	193			
Mashpee River	56.5	78			
Nemasket River	0.5	122			
Quashnet River**	426.0	32			
Taunton River	<u>8.9</u>	219			
	492.1				
Pond/Coastal Access: 12			Total Acreage Area by Area Type		
Agawam Mill Pond	1.2	216	(Through FY 01)		
Bakers Pond	1.7	79	Wildlife Management Areas: 124	114,589.0 acres	
Bearse Pond	5.8	72	Wildlife Sanctuaries: 13	1,197.0	
Clapps Pond	68.4	87	Fish Hatcheries: 5	559.3	
Cooks Pond	3.0	73	Game Farms: 3	367.1	
Dogfish Bar Beach (PAB)	2.4	210	Streambank: 28	1,909.9	
Lake Snipatuit	0.5	92	Salt Marsh: 6	690.6	
Sandy Point	0.2	54	Lake, Pond & Coastal Access: 25	293.4	
Scorton Creek	5.5	228	Fisheries & Wildlife Areas: 2	171.5	
Spectacle Pond	0.3	224	NHESP Areas: 29	1,864.8	
Triangle Pond	81.9	256	Conserv. Restriction/Easements: 24	10,272.5	
Wakeby Pond	<u>15.9</u>	242	(Some CR's are noted in district tallies)		
	186.8		Other*: 21	<u>825.6</u>	
Military Lands: 7			GRAND TOTAL	132,740.7	
Dillingham Lot	37.0				
Fisk Forestdale Lot	117.0	46			
Hog Pond Lot	26.2	42			
Lawrence Pond Lot	10.0	43			
Mashpee Pond Lot	25.0	40			

* NHESP priority area-Departmental taking

** 360 acres of Quashnet held jointly with DEM

**Includes: Pond Systems, Military Lands, Forest Areas, Wildlife Districts, Islands, Hatchery Land, MDC/F&W Areas and Marsh Management Areas.*

Above figures include departmental acquisitions.

FEDERAL AID PROGRAM ADMINISTRATION

James M. Casey
Federal Aid Coordinator

Project Objectives: *To implement the Division of Fisheries and Wildlife's Federal Aid program, acting through the Deputy Director, including overview of documentation, reporting, compliance with acts and regulations, and other requirements for administration of federal grants, as well as serving in liaison between the grantee and the Region 5 office of the U.S. Fish and Wildlife Service (FWS), grant administrator for the U.S. Department of the Interior.*

Federal Aid in Wildlife Restoration (Pittman-Robinson)

The Division's apportionment of Federal Aid in Wildlife Restoration (Pittman-Robinson) or more commonly known as "PR" funds, \$1,620,915.00 was a decrease from last year's apportionment. These funds are available for wildlife restoration projects and hunter education. Six projects were reimbursed with these funds. Projects included wildlife research, hunter education, wildlife population trends and harvest surveys, waterfowl research and management and wildlife habitat management. The Division submitted one land acquisition grant under PR for a parcel of property known as Northlands Cranberries Inc., in Hanson and Halifax for a total cost of \$4,000,000.00 of which we are seeking \$1,500,000.00 dollars in reimbursement.

In accordance with Section 10 of the Wildlife and Sport Fish Restoration Programs Improvement Act of 2000 (Public Law 106-408, 11/1/2000), \$225,000.00 was made available to Massachusetts under P-R funding for hunter education enhancements. This money is intended to supplement, not replace existing hunter education monies. This year's Section 10 funding was available for one year only and it could not be used to fund any activities other than hunter education program enhancements. Thus, an additional \$300,000.00 (\$225,000.00 when reimbursed at 75%) was spent in FY 2002 on our hunter education program in concert with the act.

Federal Aid in Sport Fish Restoration Act (Dingell- Johnson and Wallup-Breaux)

The State's Federal Aid in Sport Fish Restoration Act (Dingell-Johnson and Wallup-Breaux) reimbursement or more commonly referred to as "D-J and W-B" of \$2,927,868 represents an increase from last years apportionment. These funds were divided as follows: The Division's Public Access Board, which is responsible for

constructing and maintaining motorboat access facilities received \$439,180.20 (15%) and the balance of \$2,488,687.80 was divided equally (\$1,244,343.90 each) between the Division of Marine Fisheries and the Division of Fisheries and Wildlife. Nineteen grants were reimbursed with D-J and W-B funds; the Public Access Board has three boating access projects, the Division of Marine Fisheries conducts approximately ten fisheries projects and the Division of Fisheries and Wildlife has six projects. The Division's D-J and W-B projects include aquatic research education, anadromous fish restoration and program coordination. The Division of Fisheries and Wildlife also utilizes these funds for hatchery operations, hatchery maintenance and distribution of hatchery fish.

The Endangered Species Act of 1973 (Section 6)

The Division continues to receive a minimal amount of Endangered Species funding for its' programs. The Division's Natural Heritage and Endangered Species section received \$30,000.00 for Section-6 Endangered Species Act funding in 2002. This is a 25% decrease from previous years funding. This funding is used to partially reimburse two endangered species recovery projects, bald eagle and piping plover.

Wildlife Conservation and Res- toration Program (WCRP)

The Wildlife Conservation and Restoration Program (WCRP) is a program established by Congress through Title IX of the Commerce, Justice and State Appropriations Act of 2001. WCRP amends the Pittman-Robertson Act to include a new sub-account for "Wildlife Conservation and Restoration" from which funds are to be allocated by formula to the State fish and wildlife agencies to address the unmet needs for a diverse array of wildlife and associated habitats, for wildlife conservation, conservation education, and wildlife associated recreation, under the terms and conditions defined in the Title. Statutory authorization for appropriation is for FY2001, thus providing a one-year funding source in the form of reimbursements to States for approved wildlife projects.

To be eligible for funding a State must agree to develop and implement a Wildlife Conservation Strategy within five years. Massachusetts' commitment to develop a wildlife strategy under WCRP was submitted and approved on May 25, 2001, but still requires the submit-

tal of an actual Wildlife Conservation Strategy. \$737,272.00 in federal funding is now available (as a reimbursement at 75%) for obligation through September 30, 2003 (total project costs will be \$989,636). The Massachusetts Division of Fisheries and Wildlife has funded one project titled, "Protecting Massachusetts' Natural Heritage" that is Funded at \$375,000.00 federal share or \$500,000.00 in total costs through 6/30/2002. Plans to fund a second project are in development.

State Wildlife Grants (SWG)

President Bush signed the Department of the Interior and Related Agencies Appropriations Act, 2002, into law on November 5, 2001. This bill included \$80 million for wildlife conservation grants to States and to the District of Columbia, Puerto Rico, Guam, the United States Virgin Islands, the Northern Mariana Islands, and American Samoa. The Fish and Wildlife Service apportion the funds on a formula basis. The formula is identical to the one used last year to apportion the funds under WCRP. \$1,182,241.00 in federal funding is available to Massachusetts for obligation until September 30, 2003 (total project costs will be \$1,576,322.00), after which the Service will reapportion any remaining unobligated funds, with any new funds appropriated in 2004.

Under SWG two types of activities are eligible for funding, planning activities and implementation activities. States must use SWG allocations to fund the development and implementation of programs that benefit wildlife and their habitat, including species that are not hunted or fished. All activities that meet these criteria are eligible for funding. Consistent with the law, priority for use of these funds should be placed on those species with the greatest conservation need and taking into consideration the relative level of funding available for the conservation of those species. In addition, a State cannot use SWG to fund projects associated with wildlife education, wildlife law enforcement activities, or wildlife-associated recreation. The federal reimbursement of planning grants shall not exceed 75 percent of the total project cost, and the federal reimbursement of implementation grants shall not exceed 50 percent of the total project cost. Plans to fund projects under this program are in development.

Like WCRP, in order to establish eligibility for these funds, the State, Territory, or other jurisdiction must first submit or commit to develop by October 1, 2005, a comprehensive wildlife conservation plan. Massachusetts' commitment to develop a comprehensive wildlife conservation plan under SWG was submitted and approved on April 10, 2002, but still requires the submittal of an actual comprehensive wildlife conservation plan.

Other Matters

The Division of Fisheries and Wildlife contracted with the Auditor of the Commonwealth to conduct an audit of all Sport Fish and Wildlife Restoration grants administered by the Division for fiscal years 1999 and 2000. The Coordinator's Office spent considerable time facilitating the audit by providing records, performing additional data analysis and coordinating audit efforts within the agency. We wrapped up our state audit with an exit conference in November of 2001. An official audit report from the Auditor of the Commonwealth of Massachusetts was released in February of 2002. The next state audit will cover fiscal years 2001 and 2002 and is expected to begin in fiscal year 2003.

Other Federal Aid Coordinator's responsibilities include responding to questionnaires, public inquiries, DFW personal property inventory management, overview of projects performance and financial reporting, Federal Aid database management and cost tracking, project assistance (both field and office), conducting field visits, and to serve as the liaison between U.S. Fish and Wildlife Service Federal Aid personnel and the DFW.

MAINTENANCE / DEVELOPMENT

Gary Zima
Senior Planner

Division maintenance and development projects enable us to maintain and improve conditions at *MassWildlife* facilities throughout the state. The following are highlights of projects completed in FY 02:

Major emphasis throughout FY 02 was on the emergency cleanup of two fields contaminated with asbestos debris and two buildings damaged by fire at the High Ridge Wildlife Management Area (WMA), Westminster, MA. This operation consisted of all aspects of the project from preparation of requests for proposals (RFPs) to awarding cleanup contracts to overseeing cleanup operations. The second phase of this contract involved the inspection and assessment relative to asbestos of three additional structures scheduled for demolition in the near future.

Technical Specifications were prepared for a second major project also located on the High Ridge WMA. The undertaking involves the remediation of two inactive landfills, installation of a new subsurface sewage disposal system at the Hunter Education Building and the removal of six underground storage tanks also on site.

The Hunter Education Building at the High Ridge WMA was the site of numerous improvements. A new steam boiler was installed to upgrade the heating system. A complete asbestos abatement was performed in the basement providing safe storage for program equipment. and all flat portions of the building's roof were re-covered.

The study being conducted at the Lake Dennison Firing Range on the Birch Hill Wildlife Management Area, Winchendon, MA continues. The contract there is for environmental sampling and analyses for Lead and total Lead. The analysis report, expected in January 2003, will provide laboratory results and final recommendations for cleanup.

The Westboro Field Headquarters Complex saw upgrades to the rear entry door at the Field Headquarters Building. One of the improvements consisted of a fire / panic bar for emergency egress. Another upgrade was the installation of an entrance awning over the main door to the Bio-Mapping Trailer.

LEGISLATIVE REPORT

Jack Buckley
Deputy Director

Chapter 43 of the Acts of 2001

AN ACT AUTHORIZING THE DIVISION OF FISHERIES AND WILDLIFE TO ACQUIRE CONSERVATION RESTRICTIONS TO LANDS OF THE DALTON FIRE DISTRICT.

Summary: As required by Article 97 of the Massachusetts Constitution, this legislation authorized the Division to take or otherwise acquire lands owned by the Dalton Fire District and authorized the Fire District to convey to the Division parcels identified in the legislation. The acquisition of a conservation restriction on 2,500 acres was completed in late July 2001. This parcel represents a key acquisition that ties together approximately 15,000 acres of Division own abutting lands.

July 19, 2001

Chapter 66 of the Acts of 2001

AN ACT AUTHORIZING THE COMMONWEALTH TO ACQUIRE CONSERVATION RESTRICTIONS TO LANDS OF THE SPRINGFIELD WATER AND SEWER COMMISSION.

Summary: As required by Article 97 of the Massachusetts Constitution, this legislation authorized the Division to take or otherwise acquire lands owned by the Springfield Water and Sewer Commission and authorized the Springfield Water and Sewer Commission to convey to the Division parcels identified in the legislation. The acquisition of a conservation restriction on 1,500 acres was completed in late July 2001. This acquisition abutted the 1,500 acres Facing Rock Wildlife Management Area and provided the public with access to the Ludlow Reservoir a significant fisheries resource.

August 10, 2001

Chapter 23 of the Acts of 2002

AN ACT DESIGNATING NATURAL HERITAGE FUNCTIONS OF THE DEPARTMENT OF FISHERIES, WILDLIFE AND ENVIRONMENTAL LAW ENFORCEMENT.

Summary: This legislation changes all statutory references to “nongame” or “non-game” and replaces them with “Natural Heritage and Endangered Species”. The major significance of this change is that the Nongame Advisory Committee is now officially known as the Natural Heritage and Endangered Species Committee.

February 8, 2002

Chapter 47 of the Acts of 2002

AN ACT RELATIVE TO THE ENVIRONMENTAL PROTECTION OF THE MASSACHUSETTS MILITARY RESERVATION.

Summary: Comprehensive legislation that defines the management and ownership of the Massachusetts Military Reservation (MMR). The legislation creates the 15,000 acre Upper Cape Water Supply Reserve as public conservation land that shall be dedicated to (a) the natural resource purposes of water supply and wildlife habitat protection and the development and construction of public water supply systems, and (b) the use and training of the military forces of the Commonwealth; provided that, such military use and training is compatible with the natural resource purposes of water supply and wildlife habitat protection. The custody, care, and control of the Reserve were transferred to the Division. In addition, the legislation established an environmental management commission to ensure that all military and other activities on the reserve are consistent with the purposes of the reserve. The commission consists of three members: Commissioner of Fisheries, Wildlife, and Environmental Law Enforcement; the Commissioner of Environmental Management, and the Commissioner of Environmental Protection. The commission is assisted by a community advisory council and a scientific advisory council appointed by the Governor.

March 5, 2002

PERSONNEL REPORT

Peter Burke
Personnel Officer

New Hires

NAME	TITLE	DATE OF HIRE
Patrick Regan	Laborer I	8/1/99
Cookman, Lori	Wildlife Technician I	07/01/01
Coughlin, Mark	Wildlife Technician I	09/09/01
Ho, Peter	Wildlife Technician I	09/16/01
Lamb, Nancy	Wildlife Technician I	04/28/02
Lundy, Kimberly	Aquatic Biologist I	10/28/01
Moquin, Cathy	Wildlife Technician I	10/28/01
Moruzzi, Trina	Aquatic Biologist II	09/09/01
Truesdell, Philip	Right of Way Agent III	09/30/01
Tynan, Walter	Wildlife Technician I	08/31/01
Banks, Carrie	Student Intern	10/28/01
Christopher, Thomas	Scientist	10/28/01
Crawford, Richard	Program Coordinator	07/01/01
Eddy, Nancy	Administrative Assistant	10/28/01
Garretson, Frances	Scientist	10/09/01
Imai, Asuka	IT Professional	10/21/01
Stuart, Chloe	Scientist	10/28/01

Promotions

NAME	TO TITLE	DATE OF PROMOTION
Beals, Dale	Wildlife Technician II	7/01/01

Transfers

NAME	TITLE	DATE
Blodget, Bradford	Conservation Biologist III	10/07/01
Dinkeloo, Hanni	Conservation Biologist III	10/07/01
French, Thomas	Program Manager VI	07/01/01
Huckery, Patricia	Conservation Biologist III	10/07/01
Melvin, Scott	Conservation Biologist III	10/07/01
Somers, Paul	Conservation Biologist III	10/07/01
Swain, Patricia	Conservation Biologist III	10/07/01
Burne, Matthew	Scientist	07/01/01
Corcoran, Claire	Scientist	07/01/01
Loose, Jennifer	Scientist	07/01/01
McGrath, Erica	Program Coordinator	07/01/01
Moruzzi, Trina	Scientist	07/01/01
Mostello, Carolyn	Scientist	11/11/01
Nelson, Michael	Scientist	07/01/01
Patalano, Jessica	Student Intern	07/01/01
Putnam, Nancy	Scientist	07/01/01
Singfield, Joanne	Scientist	07/01/01
Clark, James	Laborer II	04/28/02

Leave of Absence

NAME	TITLE	START OF LEAVE	RETURN	TYPE OF LEAVE
Cavaliere, Mary	Clerk III	5/07/01	9/10/01	Personal

Miscellaneous Transactions

Paid Work Out of Grade

NAME	CURRENT TITLE	OUT O. G. TITLE	FROM	TO	COMMENTS
Giannetti, Marie	Clerk III	Clerk IV	03/29/00	01/02/02	
Henry, Stephen	Fiscal Officer V	Fiscal Officer VI	1/4/1999	PRESENT	Needs new MQ
Hurley, Stephen	Aquatic Biologist I	Dist. F&G Supervisor	3/18/2002	PRESENT	Pending appt. to ERI Pos.

Terminations

NAME	TITLE LEFT	DATE	COMMENT
Bergin, Joseph	Aquatic Biologist III	03/15/02	ERIP (Early Retirement Incentive Program)
Besse, John	Aquatic Biologist I	03/15/02	ERIP
Blodgett, Bradford	Conservation Biologist III	03/15/02	ERIP
Brenner, Phillip	Right of Way Agent III	07/18/01	Retired
Cannata, Richard	Wildlife Technician II	03/15/02	ERIP
Ciborowski, Michael	Aquatic Biologist I	03/15/02	ERIP
Dinkeloo, Hanni	Conservation Biologist III	02/02/02	Resigned
Easte, William	Aquatic Biologist II	03/15/02	ERIP
Giannetti, Maria	Clerk III	01/16/02	resigned
Hambly, Louis	Fish & Wildlife Supervisor	03/15/02	ERIP
Hartleb, Marcia	Clerk III	03/15/02	ERIP
Jackson, Peter	Aquatic Biologist I	03/15/02	ERIP
Keller, Richard	Aquatic Biologist III	03/15/02	ERIP
Kucharczyk, Annette	Clerk III	03/15/02	ERIP
McLaughlin, Charles	Aquatic Biologist I	03/15/02	ERIP
Moriarty, John	Wildlife Technician II	03/15/02	ERIP
Prescott, Carl	Program Manager VII	03/15/02	ERIP
Bullock, Corey	Scientist	06/15/02	END OF CONTRACT
Imai, Asuka	IT Professional	01/12/02	Resigned



Retiree **Pete Jackson** (center) with Northeast Supervisor Chuck Bell and Director Wayne MacCallum.



Retirees **Carl Prescott** and **Lou Hambly** with Director Wayne MacCallum.

FINANCIAL REPORT

Financial Staff

Stephen Henry, *Assistant Director*
Financial Affairs

Mary Cavaliere

Gail Gibson

Lillian Hew

Yunus Khalifa

Nancy Melito

Carl Lui

Elizabeth Sienczyk

Helen Yung

How the Sportsmen's Dollar Was Spent

Inland Fish and Game Fund

July 1, 2001 to June 30, 2002

PROGRAMS/ASSESSMENTS	EXPENDITURES	PERCENTAGES
ADMINISTRATION:		
Administration	\$1,250,330	
Information/Education	\$606,809	
Total	\$1,857,139	19.08%
Fisheries and Wildlife Programs:		
Hatcheries	\$1,404,909	
Game Farm ¹	\$310,144	
Cooperative Units	\$65,378	
Fisheries and Wildlife Management	\$3,392,112	
Total	\$5,172,543	53.13%
Other Programs:		
Natural Heritage Program ²	\$164,335	
Hunter Safety Program	\$422,147	
Waterfowl Management Program	\$40,517	
Land Acquisitions	\$1,289,472	
Total	\$1,916,471	19.69%
Other Assessments:		
Retirement Fund	\$778,408	
Operating Transfer Out	\$10,781	
Total	\$789,189	8.11%
TOTAL EXPENDITURES	\$9,735,342	100.00%

¹ Game Farm is closed. Expenditure represents cost of purchasing pheasant and quail.

² 22.3% of Natural Heritage Program Expenditures charged to Inland Fish and Game Fund, 35.7% to the Nongame Wildlife Fund and 42% to the General Fund.

Summary

Revenues, Expenditures and Fund Equity

Natural Heritage & Endangered Species Fund

July 1, 2001 to June 30, 2002

REVENUES:

Nongame Wildlife Tax Checkoff Donations	\$191,613
Direct Donations	\$10,946
Fund Interest	\$482
Sales Other	\$20,242
Federal Aid and Indirect Costs Reimbursements	\$261,942
TOTAL REVENUES	\$485,225

EXPENDITURES:

Natural Heritage and Endangered Species Program	\$250,285
Fringe Benefits Costs	\$39,991
TOTAL EXPENDITURES	\$290,276

TOTAL FUND EQUITY	\$185,672
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Other Funds and Programs Expenditures (Division Wide)

July 1, 2001 to June 30, 2002

CAPITAL OUTLAY FUNDS and OTHER APPROPRIATIONS:

GIS Bio-Map Project (Bond)	\$562,149
Upland Wildlife Habitat Management (Bond)	\$272,155
Habitat Restoration Project (Bond)	\$182,880
Bald Eagle Project (Trust)	\$2,318
Tern Restoration — New Bedford Harbor Project (Trust)	\$125,454
Coastal Plain Ponds (Federal Grant)	\$24,242
Lake Surveys for TMDL (DEP Grant)	\$32,157
Vernal Pool Program (Bond)	\$6,200
Fish Sampling Equipment Acquisition and Field Work (Bond)	\$43,636
Blueback Herring Survey — Westfield River (Bond)	\$7,900
McLaughlin Hatchery Renovations (Bond Funds)	\$6,487
Sunderland Hatchery Renovations (Bond Funds)	\$558
Sandwich Hatchery Renovations (Bond Funds)	\$347
TOTAL EXPENDITURES	\$1,266,483

Summary Revenue and Fund Equity Inland Fish and Game Fund

July 1, 2001 to June 30, 2002

DEPARTMENTAL REVENUES:	Amount
Fishing, Hunting and Trapping Licenses	\$5,600,073
Archery Stamps	\$130,192
Primitive Firearms Stamps	\$113,102
Trap Registrations	\$660
Waterfowl Stamps-Administration	\$10,537
Waterfowl Stamps-Ducks Unlimited	\$11,860
Waterfowl Stamps-Other	\$35,581
Wildlands Stamps	\$1,070,032
Antlerless Deer Permits	\$175,965
Bear Permits	\$16,729
Turkey Permits	\$66,117
Special Licenses, Tags and Posters	\$77,594
Magazine Subscriptions	\$123,282
Sales, Other	\$33,946
Fines and Penalties	\$22,265
Rents	\$43,433
Miscellaneous Income	\$7,192
Miscellaneous Refunds Previous Years	\$7,880
Debt Collection	\$1,605
Total	\$7,548,045
 FEDERAL AID REIMBURSEMENTS:	
Dingell-Johnson (Fisheries)	\$1,290,499
Pittman-Robertson (Wildlife)	\$1,866,694
Indirect Cost Reimbursement	\$825,114
Total	\$3,982,307
 TAXES:	
Gasoline Tax Apportionment	\$879,598
 OTHER FINANCIAL SOURCES:	
Reimbursement for Half-Price Licenses	\$99,657
Investment Earnings	\$93,306
Total	\$192,963
 TOTAL REVENUE	\$12,602,913
 FUND EQUITY AS OF JUNE 30, 2002	\$6,248,118

License and Stamp Sales

July 1, 2001 to June 30, 2002

Type of License/Stamp	Unit Cost	Quantity	Amount
Resident Citizen/Alien Fishing	\$22.50	126,092	\$2,837,070.00
Resident Citizen Minor Fishing	\$6.50	5,491	\$35,691.50
Resident Citizen Fishing (Age 65-69)	\$11.25	4,201	\$47,261.25
Resident Citizen Fishing (Over 70, etc.)	FREE	12,169	\$0.00
Non-Res. Citizen/Alien Fishing	\$32.50	8,324	\$270,530.00
Non-Res. Citizen/Alien Fishing (3-day)	\$18.50	2,080	\$38,480.00
Resident Citizen Fishing (3-day)	\$7.50	905	\$6,787.50
Non-Res. Minor Fishing	\$8.50	253	\$2,150.50
Duplicate Fishing	\$2.50	524	\$1,310.00
Resident Citizen Trapping	\$30.50	246	\$7,503.00
Resident Citizen Minor Trapping	\$6.50	5	\$32.50
Resident Citizen Trapping (Age 65-69)	\$15.25	13	\$198.25
Duplicate Trapping	\$2.50	8	\$20.00
Resident Citizen Hunting	\$22.50	24,137	\$543,082.50
Resident Citizen Hunting (Age 65-69)	\$11.25	794	\$8,932.50
Resident Citizen Hunting (Paraplegic)	FREE	237	\$0.00
Resident Alien Hunting	\$22.50	203	\$4,567.50
Non-Res. Cit./Alien Hunting (Big Game)	\$94.50	1,834	\$173,313.00
Non-Res. Cit./Alien Hunting (Small Game)	\$60.50	823	\$49,791.50
Resident Citizen Minor Hunting (Age 12-17)	\$6.50	1,288	\$8,372.00
Duplicate Hunting	\$2.50	249	\$622.50
Resident Citizen Sporting	\$40.00	37,248	\$1,489,920.00
Resident Citizen Sporting (Age 65-69)	\$20.00	2,161	\$43,220.00
Resident Citizen Sporting (Over 70)	FREE	10,042	\$0.00
Duplicate Sporting	\$2.50	668	\$1,670.00
Quabbin 1-Day Fishing	\$5.00		\$9,275.00
Comm Shtg Preserve (1-day)	\$2,330.00		

Total License Sales (GROSS)	309,995	\$5,582,131.00
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Archery Stamps	\$5.10	25,538	\$130,243.80
Primitive Firearms Stamps	\$5.10	22,277	\$113,612.70
Collectors (Archery & Primitive Firearms Stamps)		\$594.10	
Collection of Bad Debts and Shortage Payments	\$125,602.14		
Fees Retained by Clerks	(\$23,772.10)		
Licenses-Refunds	(\$4,751.65)		
Trap Registrations	\$660.00		
Bad Checks/Shortages	(\$80,293.03)		

Total License Sales (NET)		\$5,844,026.96
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Waterfowl Stamps	\$5.00	10,660	\$53,300.00
Collectors (Waterfowl Stamps)	\$5,871.90		
Fees Retained by Clerks	(\$1,193.50)		
Wildlands Stamps	\$5.00	214,986	\$1,074,930.00
Wildlands Stamps (Donations)	\$2,213.27		
Wildlands Stamps (Refunds)	(\$7,111.00)		

Total License/Stamps Sales (NET)		\$6,972,037.63
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APPENDIX I

Statewide Survey and Inventory Procedures

1. Introduction

There are a total of 28 named river basins ranging in size from the Shawsheen River basin, with only 77 square miles of drainage area in Massachusetts, to the Chicopee River basin, covering more than 721 square miles within Massachusetts.

The extensive and diverse fishery resources found in the Commonwealth are of enormous recreational and economic benefit. They provide employment, tourism, and wholesome, family-oriented recreational opportunities for hundreds of thousands of people and contribute millions of dollars to the state's economy. It is in the best interest of the Commonwealth to secure these benefits by protecting and restoring healthy fish populations and enhancing fishing opportunities. This initiative is imperative if we are to protect and restore fisheries habitat and to enhance access for fisheries uses for present and future generations.

The Division of Fisheries and Wildlife (DFW) is responsible for the protection, perpetuation, restoration, and management of Massachusetts' fauna and flora. Conservation of aquatic resources, including the fish, wildlife, and associated habitats is crucial if the DFW is to meet the terms of its mandate.

The simple presence of substantial aquatic habitat does not imply environmental health and integrity. According to Naiman et al. (1995) "over the past 50 to 200 years, the freshwaters of the United States have undergone the most significant transformation they have experienced in nearly 10,000 years." Virtually all watersheds, except some small headwater catchments, have been modified and degraded by human development (Williams et al. 1997).

The Environmental Protection Agency (EPA) estimates that of waters surveyed, only 60% of river miles, 55% of lake acres, and 61% of estuary mileage designated for aquatic life support, fully support such use. Nationwide, 70 to 90% of all natural riparian habitats have been extensively altered nationwide and over 80% of stream fish communities are adversely affected by environmental degradation (Judy et. al 1984). Some of the major causes of alteration are reduced flow (affecting 40% of perennial streams), siltation, bank erosion, and channelization (affecting 41% of perennial streams). Lastly, a conservative estimate of 2.6 million lake-acres are impaired by material carried by inflowing tributaries. This wide spread disturbance has lead to a loss of watershed products and function such as high quality water and productive soils. These products and func-

tions are important for moderation of flood and drought conditions and maintenance of diverse plant and animal communities (Williams et al. 1997).

Massachusetts, specifically, has suffered severe habitat alteration. Information from the Massachusetts Department of Environmental Protection (DEP) has determined that only 3% of assessed river miles and 4% of assessed lake acres fully support aquatic life as dictated by the language of the Clean Water Act. Loss of fish habitat has caused significant declines in fish populations and access to fishing opportunities throughout the Commonwealth. Channelization, eutrophication, installation of flood-control structures, erosion, sedimentation, excessive water flow diversion and consumption, destruction or modification of wetlands, and other physical impacts have degraded fish habitat. The degradation in Massachusetts has not been uniformly distributed. Urban Communities are disproportionately affected by aquatic habitat loss, loss of species diversity, invasion of exotic species, and lack of public access to waterways and fishing opportunities. Fish populations are often impacted by alteration and poor land and water use practices.

Information available on the condition of our waterways will allow society a better understanding of the consequences of extensive land and water use. This understanding translates into simple terms: goods, services, and values associated with terrestrial environments come from healthy watersheds. Increased public awareness leads to several immediate changes in the way we treat watersheds. These changes range from legislative - a willingness to accept more environmentally friendly regulations, to simple practices - like the use of native plants in restoration efforts (Williams et al.1997). This better understanding will allow us to focus stakeholder efforts on initiatives that will protect the best remaining habitat and restore habitat that has been degraded. The key to implementing the Fisheries Section initiative is to fully involve watershed teams and volunteers that will form the backbone of the manpower and have a vested, localized interest in the resource. The products of the Fisheries Section Initiative will be, in part, the identification of specific watershed restoration projects. Watershed teams will then have a voice in determining which projects are implemented. It is important for the Fisheries Section to work with watershed teams in a systematic, cooperative, and supportive fashion to ensure watershed restoration.

According to Williams et al. (1989) one third of North American fresh water fish species qualify for threatened, endangered, or some other sensitive status. Survey and inventory procedures developed by the Fisheries Section are designed to monitor resources and are crucial to the

conservation of these aquatic resources. Recognizing the watershed-scale environment and the effects of disturbance to aquatic habitat are the first steps in restoration (Sean 1994 – from Williams et al. 1997). The proposed initiative is one designed to develop a community-based watershed restoration program that complements the existing regulatory framework. The Division of Fisheries and Wildlife can protect and restore fisheries habitats through a watershed-based program by forming partnerships with local and regional stakeholders on a watershed by watershed basis.

The objectives for the Fisheries Section's Initiative are to focus resources on a watershed basis to:

1. assess the current status of fisheries resources,
2. create a comprehensive fisheries database,
3. develop watershed-based fisheries management plans,
4. conduct environmental review and assessment,
5. identify watershed lands that need to be protected as open space for protection and restoration of fisheries habitat and public access,
6. identify factors and activities causing adverse impacts to fisheries habitats and uses,
7. provide technical assistance and biological data to government agencies and private organizations involved in watershed management and protection, and
8. identify potential fisheries and habitat restoration projects for volunteers and watershed participant action plans.

The Statewide Watershed Initiative presents an opportunity to expand a model for data collection, database management, and watershed-based fisheries management planning that is being successfully implemented by the Fisheries Section in the Ipswich River. This project is designed to contribute to a watershed model that will incorporate hydrologic monitoring and habitat assessment in fisheries-based watershed management plan that will improve the health and integrity of the basin.

2. Methods

The methodologies used for the Statewide Watershed Plan are designed to provide historical and current information that will enable the Fisheries Section to accomplish the goals stated above.

2.1 Historical Information

An assessment of historical information will allow the Fisheries Section to identify information gaps and set sampling priorities. Background research will consist of three basic tasks. First, information will be gathered from a wide variety of historical sources. Second, this information will have to be interpreted to determine its validity and applicability. Finally, it will be computerized and referenced to be comparable to data collected during the course of the project.

Background information on each watershed will be located and consolidated from several sources. Fisheries Section field headquarters files contain the majority of all recent Fisheries Section-related sampling efforts and will be the initial source of historical data. The field headquarters files will be supplemented with information from our five district offices. Other potential source of information (Environmental Impact Reports, Diagnostic Feasibility Studies, etc.) will also be located and referenced

Historical Information will then be reviewed by biologists and managers to determine the extent to which it can be employed in the current assessment methodologies. Validation of sampling methodologies and species identification will be clarified and incorporated into metadata to document its validity. Databases will then be designed or modified to incorporate historical information where possible.

2.2 Fishery Assessment

The objective of the fishery assessment is to gather information about fish species diversity, relative abundance and length frequency distribution. Backpack, barge, and boat-operated electrofishing units will be the primary sampling mechanisms. Backpack shockers are best used in small shallow streams and are designed for headwater reaches. Barge electroshockers are designed to be used in wadeable streams with depth or current flow that make backpack shockers inefficient. Boat shockers will be used in lakes and rivers that are too deep to wade and where more power output is required.

Sampling locations will be selected based on available access, water conditions and habitat type. Fish sampling crews will conduct site visits to rivers and lakes to determine suitable access locations and sampling sites. Lotic habitat types (riffle, run, pool, etc.) and lentic habitat types (eutrophic, mesotrophic, oligotrophic) will be sub-sampled in proportion to their availability as determined by site visits. Data collection will take place from May 15 to September 15.

2.2.1 Stream and River Sampling

Crews of three to five people will conduct single pass electrofishing surveys through previously selected sites. The beginning and ending points will be marked on USGS 1:25,000 topographical maps. Sample sites will be include at least 100 meters of stream length. In situations where 100 meter reaches are not practical or possible, length of stream sampled will be measured by tape.

Crews will begin at the downstream end of a sampling site and shock to the upstream ending point. Crewmembers will use dipnets to capture fish that roll off the bottom or rise to the surface. All fish will be kept alive in five-gallon buckets, livecages positioned along the sample reach, or a livewell in the boat.

2.2.2 Lake and Pond Sampling

Crews of three to five people will sample shoreline areas by making a single pass with an electrofishing boat. The beginning and ending points for the sampling site will be marked on USGS 1:25,000 topographical maps. The crew will conduct at least three total-pickup collections of at least 15 minutes each. During this process, all fish will be collected and placed into the boat livewell. Other sampling methods (gillnet, seine) might also be employed to most effectively meet the sampling objective.

2.2.3 Data Collection

The first 100 fish of each species will be identified and measured to the nearest millimeter (except American eels and sea lampreys that will be measured to the nearest centimeter). The remaining fish in each species will be tallied by species with no length taken. No more than two percent and no less than two individuals (or one if only a single specimen is collected) of each species captured will be preserved in 10% formalin for confirmation of identification by laboratory analysis. Live fish that are not retained for preservation will be returned to the sample site.

2.3 Habitat Evaluation

Qualitative habitat assessments will be conducted in conjunction with fish sampling to evaluate the condition of the available habitat as it relates to fisheries resources. Stream width, canopy enclosure and species composition, channel morphology, and anthropogenic influences will be noted and assessed. Standardized habitat evaluation forms will also be used to assess habitat quality. Lake habitat will be characterized by morphology, local development and land use practices. Format and content of the information to be gathered concerning habitat measurements will follow established guidelines used by the Department of Environmental Protection (DEP) and the Fisheries Section.

2.4 Analysis

Information gathered during the course of the study will be entered into a database designed to be accessible to all parties involved with watershed management. Microsoft Access will be used as a standard format for data entry, storage, and manipulation. Initial summaries will be generated by statistical software to outline and highlight the information gathered during the sampling period. Summaries will include information about sampling locations (number of sites, towns sampled), sampling effort statistics (length of river sampled, types of gear used, estimates of efficiency), number and description of species encountered (relative abundance, common and scientific names, literature-documented tolerances) and habitat scores or descriptions for the sample sites. Further analyses relating habitat and fishery characteristics will be provided in final reports and will focus on delineating change in fishery characteristics with changes in available habitat.

2.5 Products

Several key products will result from this effort. This information will be used internally for several purposes. Habitat and fisheries assessments will be compiled in a database that will be used by the Fisheries Section for resource management, environmental review and assessment, land acquisition programs, and public access prioritization. The information will be made available to the public in an Internet accessible database that will aid in technical assistance roles. Completed watershed-based fisheries management plans will include summarized information from fisheries and habitat assessments and suggest options for improving habitat quality. These plans will provide guidance to watershed teams and volunteers concerning fish habitat restoration in their watershed. Examples of these projects include in-stream fish structures, riparian stabilization, maintenance of buffer strips, and public involvement and outreach.

3. Benefits

Results and reports from this research will be used in many decision-making processes within the Fisheries Section. Assessments of this nature, combined with habitat measurements and information gathered by other agencies and organizations will provide the necessary tools for developing watershed-based fisheries management plans, environmental reviews, and land-acquisition priorities. Enhancement efforts will take direction from these watershed-based fisheries management plans and will provide a mechanism for involving grass roots organizations and volunteers. The plans will use habitat, and fisheries information, combined with available hydrological information to identify projects that volunteers can participate in to restore habitat within the watershed. The Fisheries Section will provide technical and biological expertise to watershed groups and volunteers.

Resource assessment is a direct benefit of this project but it is only the first step. Determining the status of the resource, by assessing fish populations, available habitat and current conditions, allows agencies and organizations involved with watershed management to determine the most efficient path of watershed recovery. Once assessments have been completed, management and enhancement efforts can be effectively outlined.

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Table 1. Statewide Fisheries Survey and Inventory FY 02 Results

Watershed	Waterbody Name	Saris/Palis	Town
Blackstone	Abbott Run	5131025	North Attleboro
Blackstone	Abbott Run	5131025	North Attleboro
Blackstone	Bacon Brook	5131625	Uxbridge
Blackstone	Blackstone River	5131000	Northbridge
Blackstone	Blackstone River	5131000	Blackstone
Blackstone	Blackstone River	5131000	Uxbridge
Blackstone	Blackstone River	5131000	Uxbridge
Blackstone	Blackstone River	5131000	Millbury
Blackstone	Blackstone River	5131000	Sutton
Blackstone	Blackstone River	5131000	Worcester
Blackstone	Blackstone River	5131000	Millbury
Blackstone	Blackstone River	5131000	Uxbridge
Blackstone	Blackstone River	5131000	Northbridge
Blackstone	Blackstone River	5131000	Grafton
Blackstone	Centerville Brook	5132300	Douglas
Blackstone	Cold Spring Brook	5132075	Uxbridge
Blackstone	Cronin Brook	5132625	Grafton
Blackstone	Dark Brook	5132900	Auburn
Blackstone	Eddy Pond	51043	Auburn
Blackstone	Emerson Brook	5131700	Uxbridge
Blackstone	Flints Pond [N.B.]	51050	Shrewsbury
Blackstone	Hop Brook	5131250	Blackstone
Blackstone	Kettle Brook	5132800	Auburn
Blackstone	Kettle Brook	5132800	Worcester
Blackstone	Mill River	5131200	Blackstone
Blackstone	Mill River	5131200	Upton, Milford
Blackstone	Mill River	5131200	Blackstone
Blackstone	Mill River	5131200	Mendon
Blackstone	Mill River	5131200	Hopedale, Mendon
Blackstone	Mill River	5131200	Hopedale
Blackstone	Muddy Brook	5131300	Mendon
Blackstone	Muddy Brook	5131300	Mendon
Blackstone	Mumford River	5132050	Douglas
Blackstone	Mumford River	5132050	Sutton
Blackstone	Mumford River	5132050	Uxbridge
Blackstone	Mumford River	5132050	Uxbridge
Blackstone	Mumford River	5132050	Northbridge
Blackstone	Mumford River	5132050	Douglas
Blackstone	Newton Pond	51110	Shrewsbury
Blackstone	Purgatory Brook	5132125	Sutton
Blackstone	Quick Stream	5131225	Blackstone
Blackstone	Quinsigamond River	5132425	Grafton
Blackstone	Steamburg Brook	5132175	Northbridge
Blackstone	Unt Center Brook	5131976	Upton
Blackstone	Ut(Whitins Brook)	5132080	Douglas
Blackstone	Warren Brook	5132000	Upton
Blackstone	Warren Brook	5132000	Upton
Blackstone	West River	5131800	Upton
Blackstone	West River	5131800	Upton
Blackstone	West River	5131800	Uxbridge
Charles	Charles River	7239050	medway
Charles	Charles River	7239050	Medway
Charles	Cherry Brook	7239250	Weston
Charles	Mine Brook (1)	7240200	Franklin
Charles	Stony Brook (1)	7239200	Weston
Chicopee	Springfield Reservoir	36145	Ludlow
Chicopee	Ware River	3626500	Barre/Hardwick

Watershed	Waterbody Name	Saris/Palis	Town
Chicopee	Ware River	3626500	Barre/Hardwick
Chicopee	Ware River	3626500	Barre/Hardwick
Concord	Assabet Brook	8247125	Stowe
Concord	Assabet River	8246775	Concord
Concord	Assabet River	8246775	Maynard
Concord	Assabet River	8246775	Hudson
Concord	Assabet River	8246775	Northboro
Concord	Assabet River	8246775	Westboro
Concord	Assabet River	8246775	Westborough
Concord	Baiting Brook	8248150	Framingham
Concord	Bartlett Pond	82007	Northboro
Concord	Danforth Brook	8247275	Hudson
Concord	Denny's Brook	8248525	westboro
Concord	Elizabeth Brook	8247150	Stow
Concord	Farley Brook	8246600	Chelmsford
Concord	Farm Pond	82035	Framingham
Concord	Fort Meadow Brook	8247200	Hudson
Concord	Hayward Brook	8248000	Wayland
Concord	Heard Pond	82058	Wayland
Concord	Hocomonco Pond	82060	Westborough
Concord	Hop Brook	8247600	Shrewsbury
Concord	Hop Brook	8247600	Northboro
Concord	Marginal Brook	8246650	Lowell
Concord	Mill Brook	8246750	Concord
Concord	Mill Brook	8246750	Concord
Concord	Mill Brook	8247300	Bolton
Concord	North Brook	8247375	Berlin
Concord	North Brook	8247375	Berlin
Concord	Pages Brook	8246675	Carlisle
Concord	Piccadilly Brook	8248450	Westboro
Concord	Piccadilly Brook	8248450	Westboro
Concord	Pond Brook	8246625	Westford
Concord	Putnam Brook	8246575	Chelmsford
Concord	River Meadow Brook	8246525	Carlisle
Concord	River Meadow Brook	8246525	Carlisle
Concord	Rutters Brook	8248500	Westboro
Concord	Saw Mill Brook	8246725	Concord
Concord	Sudbury Reservoir	82106	Southboro
Concord	Sudbury River	8247650	Hopkinton
Concord	Sudbury River	8247650	Hopkinton, Southboro
Concord	Sudbury River	8247650	Ashland
Concord	Sudbury River	8247650	Concord
Concord	Sudbury River	8247650	Hopkinton/Southboro
Concord	Sudbury River	8247650	Ashland
Concord	Sudbury River	8247650	Wayland
Concord	Unt Assabet River	8247260	Stowe
Concord	UNT To Whitehall Brook	8248426	Hopkinton
Concord	Whitehall Brook	8248425	Hopkinton
Concord	Whitehall Brook	8248425	Hopkinton
Concord	Willis Lake	82122	Sudbury
Connecticut	Fall River	3420925	Bernardston
Connecticut	Fall River	3420925	Bernardston
Connecticut	Manhan River	3418175	
Deerfield	Avery Brook	3315025	Charlemont
Deerfield	Bear River	3313950	Shelburne
Deerfield	Cold River	3315675	
Deerfield	Drakes Brook	3314000	Shelburne
Deerfield	North River	3314100	Colrain
Deerfield	Pelham Brook	3316075	
Deerfield	Taylor Brook	3314425	Colrain
Deerfield	West Branch North River	3314375	Colrain
Farmington	Farmington River (W.B.)	3106850	Sandisfield
Farmington	Farmington River (W.B.)	3106850	Otis
Farmington	Farmington River (W.B.)	3106850	Otis

Watershed	Waterbody Name	Saris/Palis	Town
Farmington	Lake Marguerite Brook	3107035	Sandisfield
Farmington	Otis Reservoir Brook	3107335	Otis
Farmington	Riiska Brook	3106925	Sandisfield
Farmington	Silver Brook	3107150	Sandisfield
Farmington	Silver Brook, North Branch	3107175	Sandisfield
Hoosic	Cheshire Reservoir [N.B.]	11002	Cheshire
Housatonic	Benedict Pond	21011	Great Barrington
Housatonic	Onota Lake	21078	Pittsfield
Housatonic	Onota Lake	21078	Pittsfield
Housatonic	Pontoosuc Lake	21083	Pittsfield
Housatonic	Pontoosuc Lake	21083	Pittsfield
Housatonic	Richmond Pond	21088	Richmond
Housatonic	Richmond Pond	21088	Pittsfield/Richmond
Housatonic	Stockbridge Bowl	21105	Stockbridge
Housatonic	Stockbridge Bowl	21105	Stockbridge
Merrimack	Black Brook	8451175	Lowell
Millers	Lyons Brook	3522175	Wendell
Nashua	Fallulah Brook	8144850	Lunenburg
Nashua	Fallulah Brook	8144850	Fitchburg
Nashua	Fallulah Brook	8144850	Fitchburg
Nashua	Gates Brook	8145250	West Boylston
Nashua	Gates Brook	8145250	West Boylston
Nashua	Pearl Hill Brook	8144875	Lunenburg
Nashua	Quinapoxet River	8145325	Holden
Nashua	Quinapoxet River	8145325	Holden
Nashua	Quinapoxet River	8145325	Holden
Nashua	Wyman Pond Brook	8145070	Fitchburg
Quinebaug	Rocky Brook	4129025	Douglas
South Coastal	Ben Mann Brook	9457000	Hanover
South Coastal	Drinkwater River	9456900	Hanover
South Coastal	Eel River	9458000	Plymouth
South Coastal	Eel River	9458000	Plymouth
South Coastal	First Herring Brook	9456375	Norwell
South Coastal	French Stream	9456950	Rockland
South Coastal	Indian Head Brook	9456875	Hanson
South Coastal	Indian Head River	9456800	Hanover, Pembroke
South Coastal	Indian Head River	9456800	Hanover
South Coastal	Island Creek	9457625	Duxbury
South Coastal	Jacobs Pond	94077	Norwell
South Coastal	Longwater Brook	9457025	Hanover
South Coastal	Longwater Brook	9457025	Hanover
South Coastal	Marshfield Fairgrounds Brook	9457160	Marshfield
South Coastal	Second Herring Brook	9456450	Norwell
South Coastal	Torrey Brook	9456925	Hanover
South Coastal	Ut Black Pond Brook	9456452	Norwell
South Coastal	Ut Black Pond Brook	9456452	Norwell
South Coastal	Wildcat Creek	9456550	Norwell
Taunton	Ames Long Pond	62001	Stoughton/Easton
Westfield	Abbott Brook	3210250	Chester
Westfield	Arm Brook	3208700	Westfield
Westfield	Barry Brook	3208650	Westfield
Westfield	Block Brook	3208275	West Springfield
Westfield	Bronson Brook	3211550	Chesterfield
Westfield	Bush Brook	3208625	Westfield
Westfield	Childs Brook	3211600	Worthington
Westfield	Congamond Lakes [N.B.]	32022	Southwick
Westfield	Dead Branch	3211225	Huntington, Westhampton
Westfield	Depot Brook	3210600	Becket
Westfield	Dickenson Brook	3208975	Southwick
Westfield	Drowned Land Brook	3212375	Savoy
Westfield	Ford Brook	3211875	Ashfield
Westfield	Fuller Brook	3210975	Worthington
Westfield	Geer Brook	3210500	Peru
Westfield	Great Brook	3208375	Westfield

Watershed	Waterbody Name	Saris/Palis	Town
Westfield	Great Brook	3208375	Southwick
Westfield	Johnson Brook	3208450	Southwick
Westfield	Kearney Brook	3211625	Worthington
Westfield	Kellog Brook	3208400	Southwick
Westfield	Kinne Brook	3210800	Huntington
Westfield	Little River	3208725	Westfield
Westfield	Little River	3211100	Worthington
Westfield	Little River	3208725	Westfield
Westfield	Littleville Reservoir	32046	Huntington
Westfield	May Hollow Brook	3208335	Agawam
Westfield	Mill Brook	3211950	Plainfield
Westfield	Mill Brook (1)	3211950	Plainfield
Westfield	Miller Brook	3208325	Agawam
Westfield	Moose Meadow Brook	3209700	Westfield
Westfield	Munn Brook	3208825	Westfield
Westfield	Munn Brook	3208825	Westfield
Westfield	Munn Brook	3208825	Southwick
Westfield	Munn Brook	3208825	Southwick
Westfield	Phelps Brook	3212275	Savoy
Westfield	Pond Brook	3211050	Blandford
Westfield	Pond Brook	3208600	Westfield
Westfield	Pond Brook	3208600	Westfield
Westfield	Potash Brook	3209725	Russell
Westfield	Powdermill Brook	3208575	Westfield
Westfield	Roaring Brook (1)	3210000	Montgomery
Westfield	Shaker Mill Brook	3210625	Becket
Westfield	Shaw Brook	3212150	Windsor
Westfield	Shurtleff Brook	3208925	Southwick
Westfield	Slab Brook	3208425	Southwick
Westfield	Stage Brook	3209850	Russell
Westfield	Steep Bank Brook	3212325	Windsor
Westfield	Stones Brook	3211825	West Cummington
Westfield	Swift River	3211775	Cummington
Westfield	Swift River (N.B.)	3211800	Cummington
Westfield	Tower Brook	3211700	Windsor
Westfield	Walker Brook	3210300	Chester
Westfield	Wards Stream	3211175	Worthington
Westfield	Wards Stream	3211175	Worthington
Westfield	Watts Brook	3211150	Worthington
Westfield	Westfield Brook	3212050	Windsor/Cummington
Westfield	Westfield River	3208250	Agawam
Westfield	Westfield River	3208250	Chesterfield
Westfield	Westfield River	3208250	Russell
Westfield	Westfield River	3208250	Chesterfield
Westfield	Westfield River	3208250	Russell
Westfield	Westfield River (E.B.)	3211030	Cummington
Westfield	Westfield River (M.B.)	3210725	Huntington
Westfield	Westfield River (M.B.)	3210725	Worthington
Westfield	Westfield River (W.B.)	3210075	Huntington
Westfield	Westfield River (W.B.)	3210075	Huntington
Westfield	White Brook	3208300	Agawam
Westfield	Windsor Jambs Brook	3212200	Windsor
Westfield	Yokum Brook	3210550	Becket